

200 AC/DC

TRANSTIG®

INVERTER ARC WELDER



Service Manual

Revision No: AA

Issue Date: January 17, 2008

Manual No.: 0-5001

Operating Features:





WE APPRECIATE YOUR BUSINESS!

Congratulations on your new CIGWELD product. We are proud to have you as our customer and will strive to provide you with the best service and reliability in the industry. This product is backed by our extensive warranty and world-wide service network. To locate your nearest distributor or service agency please call +61-3-9474-7400, or visit us on the web at **www.cigweld.com.au**.

This Operating Manual has been designed to instruct you on the correct use and operation of your CIGWELD product. Your satisfaction with this product and its safe operation is our ultimate concern. Therefore please take the time to read the entire manual, especially the Safety Precautions. They will help you to avoid potential hazards that may exist when working with this product.

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CIGWELD is a Global Brand of Arc Welding Products for Thermadyne Industries Inc. We manufacture and supply to major welding industry sectors worldwide including; Manufacturing, Construction, Mining, Automotive, Aerospace, Engineering, Rural and DIY/Hobbyist.

We distinguish ourselves from our competition through market-leading, dependable products that have stood the test of time. We pride ourselves on technical innovation, competitive prices, excellent delivery, superior customer service and technical support, together with excellence in sales and marketing expertise.

Above all, we are committed to develop technologically advanced products to achieve a safer working environment for industry operators.



WARNINGS

Read and understand this entire Manual and your employer's safety practices before installing, operating, or servicing the equipment.

While the information contained in this Manual represents the Manufacturer's best judgement, the Manufacturer assumes no liability for its use.

Transtig 200 AC/DC Inverter Arc Welder
Operating Manual Number 0-5001 for:
Part Number 700719

Published by:
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Publication Date: January 17, 2008

Record the following information for Warranty purposes:

Where Purchased: _____

Purchase Date: _____

Equipment Serial #: _____

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SECTION 1: ARC WELDING SAFETY INSTRUCTIONS AND WARNINGS



WARNING

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR. DO NOT LOSE THESE INSTRUCTIONS. READ OPERATING/INSTRUCTION MANUAL BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.

Welding products and welding processes can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions.

Safe practices have developed from past experience in the use of welding and cutting. These practices must be learned through study and training before using this equipment. Some of these practices apply to equipment connected to power lines; other practices apply to engine driven equipment. Anyone not having extensive training in welding and cutting practices should not attempt to weld.

Safe practices are outlined in the Australian Standard AS1674.2-2007 entitled: Safety in welding and allied processes Part 2: Electrical. This publication and other guides to what you should learn before operating this equipment are listed at the end of these safety precautions. **HAVE ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR WORK PERFORMED ONLY BY QUALIFIED PEOPLE.**

1.01 Arc Welding Hazards

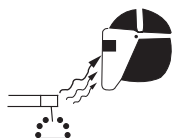


WARNING

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Disconnect input power or stop engine before installing or servicing this equipment. Lock input power disconnect switch open, or remove line fuses so power cannot be turned on accidentally.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. Turn off all equipment when not in use. Disconnect power to equipment if it will be left unattended or out of service.
7. Use fully insulated electrode holders. Never dip holder in water to cool it or lay it down on the ground or the work surface. Do not touch holders connected to two welding machines at the same time or touch other people with the holder or electrode.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not wrap cables around your body.
10. Ground the workpiece to a good electrical (earth) ground.
11. Do not touch electrode while in contact with the work (ground) circuit.
12. Use only well-maintained equipment. Repair or replace damaged parts at once.
13. In confined spaces or damp locations, do not use a welder with AC output unless it is equipped with a voltage reducer. Use equipment with DC output.
14. Wear a safety harness to prevent falling if working above floor level.
15. Keep all panels and covers securely in place.


WARNING

ARC RAYS can burn eyes and skin; NOISE can damage hearing.

Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.

1. Wear a welding helmet fitted with a proper shade of filter (see ANSI Z49.1 listed in Safety Standards) to protect your face and eyes when welding or watching.
2. Wear approved safety glasses. Side shields recommended.
3. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
5. Use approved ear plugs or ear muffs if noise level is high.

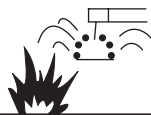

WARNING

FUMES AND GASES can be hazardous to your health.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

1. Keep your head out of the fumes. Do not breathe the fumes.
2. If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
6. Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
7. Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

Eye protection filter shade selector for welding or cutting (goggles or helmet), from AWS A 8.2-73					
Welding or Cutting operation	Electrode size Metal Thickness or Welding Current	Filter shade no.	Welding or Cutting operation	Electrode size Metal Thickness or Welding Current	Filter shade no.
Torch soldering	All	2	Gas metal arc welding		
Torch brazing	All	2 or 3	Non Ferrous base metal	All	11
Oxygen cutting			Ferrous base metal	All	12
Light	Under 1 in., 25 mm	3 or 4	Gas tungsten arc welding (TIG)	All	12
Medium	1 – 6 in., 25 – 150 mm	4 or 5	Atomic Hydrogen welding	All	12
Heavy	Over 6 in., 150 mm	5 or 6	Carbon Arc welding	All	12
Gas welding			Plasma arc Welding	All	12
Light	Under 1/8 in., 3 mm	4 or 5	Carbon Arc Gouging		
Medium	1/8 – 1/2 in., 3 – 12 mm	5 or 6	Light		12
Heavy	Over 1/2 in., 12 mm	6 or 8	Heavy		14
Shielded metal-arc welding (stick) electrodes			Plasma arc cutting		
	Under 5/32 in., 4 mm	10	Light	Under 300 Amp	9
	Under 5/32 to 1/4 in., 4 to 6.4mm	12	Medium	300 to 400 Amp	12
	Over 1/4 in., 6.4 mm	14	Heavy	Over 400 Amp	14



WARNING

WELDING can cause fire or explosion.

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.

1. Protect yourself and others from flying sparks and hot metal.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
4. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Do not weld on closed containers such as tanks or drums.
8. Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
9. Do not use welder to thaw frozen pipes.
10. Remove stick electrode from holder or cut off welding wire at contact tip when not in use.



WARNING

FLYING SPARKS AND HOT METAL can cause injury.

Chipping and grinding cause flying metal. As welds cool, they can throw off slag.

1. Wear approved face shield or safety goggles. Side shields recommended.
2. Wear proper body protection to protect skin.



WARNING

CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinder is in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.


WARNING

Engines can be dangerous.


WARNING

ENGINE EXHAUST GASES can kill.

Engines produce harmful exhaust gases.

1. Use equipment outside in open, well-ventilated areas.
2. If used in a closed area, vent engine exhaust outside and away from any building air intakes.


WARNING

ENGINE FUEL can cause fire or explosion.

Engine fuel is highly flammable.

1. Stop engine before checking or adding fuel.
2. Do not add fuel while smoking or if unit is near any sparks or open flames.
3. Allow engine to cool before fueling. If possible, check and add fuel to cold engine before beginning job.
4. Do not overfill tank — allow room for fuel to expand.
5. Do not spill fuel. If fuel is spilled, clean up before starting engine.


WARNING

MOVING PARTS can cause injury.

Moving parts, such as fans, rotors, and belts can cut fingers and hands and catch loose clothing.

1. Keep all doors, panels, covers, and guards closed and securely in place.
2. Stop engine before installing or connecting unit.
3. Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
4. To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.
5. Keep hands, hair, loose clothing, and tools away from moving parts.
6. Reinstall panels or guards and close doors when servicing is finished and before starting engine.


WARNING

SPARKS can cause BATTERY GASES TO EXPLODE; BATTERY ACID can burn eyes and skin.

Batteries contain acid and generate explosive gases.

1. Always wear a face shield when working on a battery.
2. Stop engine before disconnecting or connecting battery cables.
3. Do not allow tools to cause sparks when working on a battery.
4. Do not use welder to charge batteries or jump start vehicles.
5. Observe correct polarity (+ and -) on batteries.



WARNING

STEAM AND PRESSURIZED HOT COOLANT can burn face, eyes, and skin.

The coolant in the radiator can be very hot and under pressure.

1. Do not remove radiator cap when engine is hot. Allow engine to cool.
2. Wear gloves and put a rag over cap area when removing cap.
3. Allow pressure to escape before completely removing cap.



WARNING

This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety code Sec. 25249.5 et seq.)

NOTE

Considerations About Welding And The Effects of Low Frequency Electric and Magnetic Fields

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, Biological Effects of Power Frequency Electric & Magnetic Fields - Background Paper, OTA-BP-E-63 (Washington, DC: U.S. Government Printing Office, May 1989): "...there is now a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields and interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks."

To reduce magnetic fields in the workplace, use the following procedures.

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cable around the body.
4. Keep welding power source and cables as far away from body as practical.

ABOUT PACEMAKERS:

The above procedures are among those also normally recommended for pacemaker wearers. Consult your doctor for complete information.

1.02 PRINCIPAL SAFETY STANDARDS

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safety in welding and allied processes Part 2: Electrical, AS1674.2-2007 from SAI Global Limited, www.saiglobal.com

1.03 DECLARATION OF CONFORMITY

Manufacturer: CIGWELD
Address: 71 Gower St, Preston
Victoria 3072

Australia



Description of equipment: Welding Equipment (GMAW, MMAW, GTAW). Including, but not limited to CIGWELD Transtig 200 Pi, Transtig 200 AC/DC, Transarc 300 Si, Transtig 300 Pi, Transtig 300 AC/DC, Transmig 400 i and associated accessories.

Serial numbers are unique with each individual piece of equipment and details description, parts used to manufacture a unit and date of manufacture.

The equipment conforms to all applicable aspects and regulations of the 'Low Voltage Directive' (Directive 73/23/EU, as recently changed in Directive 93/68/EU and to the National legislation for the enforcement of the Directive.

National Standard and Technical Specifications

The product is designed and manufactured to a number of standards and technical requirements among them are:

- AS/NZS 3652-(EMC Directive EN50199) applicable to arc welding equipment - generic emissions and regulations.
- EN60974-1 applicable to welding equipment and associated accessories.
- AS60974.1 applicable to welding equipment and associated accessories.

Extensive product design verification is conducted at the manufacturing facility as part of the routine design and manufacturing process, to ensure the product is safe and performs as specified. Rigorous testing is incorporated into the manufacturing process to ensure the manufactured product meets or exceeds all design specifications.

CIGWELD has been manufacturing and merchandising an extensive equipment range with superior performance, ultra safe operation and world class quality for more than 30 years and will continue to achieve excellence.

SECTION 2: INTRODUCTION

2.01 How To Use This Manual

This Service Manual applies to just specification or part numbers listed on page i.

To ensure safe operation, read the entire manual, including the chapter on safety instructions and warnings.

Throughout this manual, the words **WARNING**, **CAUTION**, and **NOTE** may appear. Pay particular attention to the information provided under these headings. These special annotations are easily recognized as follows:



WARNING

A WARNING gives information regarding possible personal injury.



CAUTION

A CAUTION refers to possible equipment damage.

NOTE

A NOTE offers helpful information concerning certain operating procedures.

Additional copies of this manual may be purchased by contacting CIGWELD at the address and phone number for your location listed in the inside back cover of this manual. Include the Transtig 200 AC/DC Service Manual number and equipment identification numbers.

Electronic copies of this manual can also be downloaded at no charge in Acrobat PDF format by going to the CIGWELD web site listed below and clicking on the Literature Library link:

<http://www.cigweld.au.com>

2.02 Equipment Identification

The unit's identification number (specification or part number), model, and serial number usually appear on a nameplate attached to the control panel. In some cases, the nameplate may be attached to the rear panel. Equipment which does not have a control panel such as gun and cable assemblies is identified only by the specification or part number printed on the shipping container. Record these numbers on the bottom of page i for future reference.

2.03 Receipt Of Equipment

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify the carrier immediately to file a claim. Furnish complete information concerning damage claims or shipping errors to the location in your area listed in the inside back cover of this manual.

Include all equipment identification numbers as described above along with a full description of the parts in error.

Move the equipment to the installation site before uncrating the unit. Use care to avoid damaging the equipment when using bars, hammers, etc., to uncrate the unit.



CAUTION

The products applicable to this Service Manual are manufactured in various configurations for differing global requirements. Some specifications and electrical data quoted within this Service Manual may not be applicable to all products and regions. For this reason due caution and care must be exercised when using this Service Manual.

2.04 Symbol Chart

Note that only some of these symbols will appear on your model.

	On
	Off
	Dangerous Voltage
	Increase/Decrease
	Circuit Breaker
	AC Auxiliary Power
	Fuse
A	Amperage
V	Voltage
Hz	Hertz (cycles/sec)
f	Frequency
—	Negative
+	Positive
	Direct Current (DC)
	Protective Earth (Ground)
	Line
	Line Connection
	Auxiliary Power
115V 15A 	Receptacle Rating-Auxiliary Power

1	Single Phase
3	Three Phase
	Three Phase Static Frequency Converter-Transformer-Rectifier
	Remote
X	Duty Cycle
%	Percentage
	Panel/Local
	Shielded Metal Arc Welding (SMAW)
	Gas Metal Arc Welding (GMAW)
	Gas Tungsten Arc Welding (GTAW)
	Air Carbon Arc Cutting (CAC-A)
	Constant Current
	Constant Voltage Or Constant Potential
	High Temperature
	Fault Indication
	Arc Force
	Touch Start (GTAW)
	Variable Inductance
	Voltage Input

	Wire Feed Function
	Wire Feed Towards Workpiece With Output Voltage Off.
	Welding Gun
	Purging Of Gas
	Continuous Weld Mode
	Spot Weld Mode
	Spot Time
	Preflow Time
	Postflow Time
 2 Step Trigger Operation Press to initiate wirefeed and welding, release to stop.	
 4 Step Trigger Operation Press and hold for preflow, release to start arc. Press to stop arc, and hold for preflow.	
	Burnback Time
IPM	Inches Per Minute
MPM	Meters Per Minute
Art # A-04130	

2.05 Description

The Transtig 200 AC/DC is a self contained single-phase AC/DC arc welding power source with Constant Current (CC) output characteristics. This unit is equipped with a Digital Volt/Amperage Meter, gas control valve, built in Sloper and Pulser, lift arc starter, and high-frequency arc starter for use with Gas Tungsten Arc Welding (GTAW), Gas Tungsten Arc Welding-Pulsed (GTAW-P) Gas Tungsten Arc Welding-Sloped (GTAW-S), and Shielded Metal Arc Welding (SMAW) processes. The power source is totally enclosed in an impact resistant, flame retardant and non-conductive plastic case.

NOTE

Volt-Ampere curves show the maximum Voltage and Amperage output capabilities of the welding power source. Curves of other settings will fall between the curves shown.

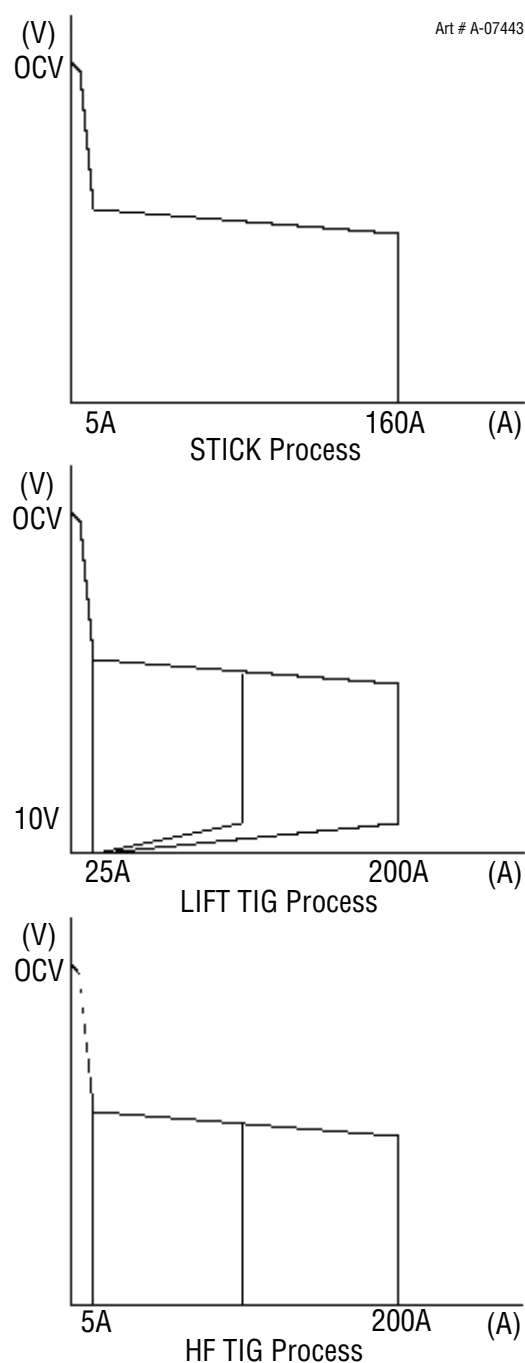


Figure 2-1: Transtig 200 AC/DC Volt-Ampere curve

2.06 Functional Block Diagrams

Figure 2-2 illustrates the functional block diagram of the 200 AC/DC-power supply.

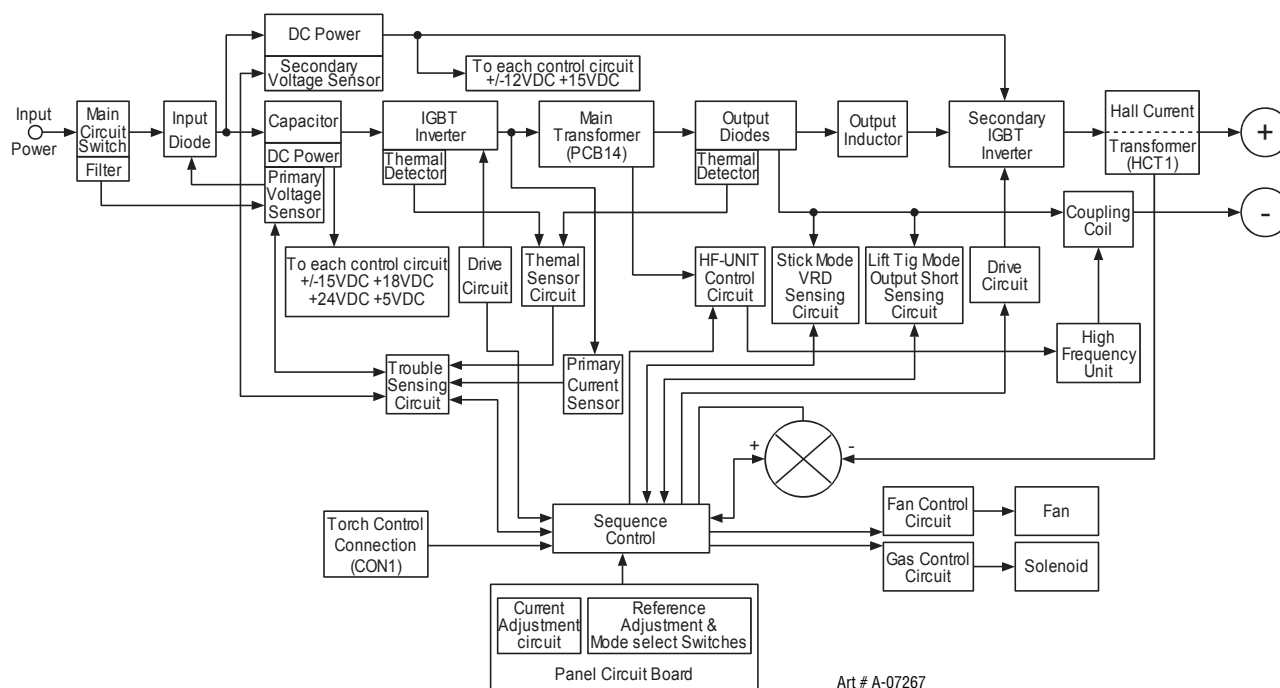


Figure 2-2: Transtig 200 AC/DC Functional Block Diagram

2.07 Transporting Methods

This unit is equipped with a handle for carrying purposes.



WARNING

ELECTRIC SHOCK can kill. DO NOT TOUCH live electrical parts. Disconnect input power conductors from de-energized supply line before moving the welding power source.

**WARNING**

FALLING EQUIPMENT can cause serious personal injury and equipment damage.

- Lift unit with handle on top of case.
- Use handcart or similar device of adequate capacity.
- If using a fork lift vehicle, place and secure unit on a proper skid before transporting.

2.08 Parameter Specifications

Parameter	Transtig 200 AC/DC
Power Source Part Number	700719
Cooling	Fan Cooled
Welder Type	Inverter Power Source
Welding Power Source Mass	19kg
Dimensions	H 360mm x W 180mm x L 420mm
Manufactured to Australian Standard	AS 60974.1-2006
Number of Phases	1
Nominal Supply Voltage	240V $\pm$ 15%
Nominal Supply Frequency	50Hz
Protection Class	IP23S

Standard Specifications (Applicable with factory fitted Supply Plug)

Parameter	Transtig 200 AC/DC
Welding Current Range	5 - 200 Amps
Open Circuit Voltage	65V
Factory Fitted Supply Plug Rating	15 Amps
Effective Input Current (I _{1eff})	15 Amps
Maximum Input Current (I ₁ max)	36.7 Amps
Single Phase Generator Requirement	8.8 KVA
Welding Output (Quoted figures refer to MMAW output)	160A @ 15%, 26.4V 80A @ 60%, 23.2V 62A @ 100%, 22.5V
Welding Output (Quoted figures refer to GTAW output)	200A @ 20%, 18.0V 130A @ 60%, 15.2V 100A @ 100%, 14.0V

Upgraded Specifications (Applicable with upgraded Supply Plug)

Parameter	Transtig 200 AC/DC
Welding Current Range	5 - 200 Amps
Open Circuit Voltage	65V
Upgraded Supply Plug Rating Required	25 Amps
Effective Input Current (I _{1eff})	23.2 Amps
Maximum Input Current (I ₁ max)	36.7 Amps
Single Phase Generator Requirement	8.8 KVA
Welding Output (Quoted figures refer to MMAW output)	160A @ 40%, 26.4V 130A @ 60%, 25.2V 100A @ 100%, 24.0V
Welding Output (Quoted figures refer to GTAW output)	200A @ 20%, 18.0V 130A @ 60%, 15.2V 100A @ 100%, 14.0V

Table 2-1: Parameter Specifications

NOTES

SECTION 3: INSTALLATION

3.01 Environment

The Transtig 200 AC/DC is designed for use in hazardous environments. Examples of environments with increased hazardous conditions are:

- a. In locations in which freedom of movement is restricted, so that the operator is forced to perform the work in a cramped (kneeling, sitting or lying) position with physical contact with conductive parts;
- b. In locations which are fully or partially limited by conductive elements, and in which there is a high risk of unavoidable or accidental contact by the operator, or
- c. In wet or damp hot locations where humidity or perspiration considerably reduces the skin resistance of the human body and the insulation properties of accessories.

Environments with hazardous conditions do not include places where electrically conductive parts in the near vicinity of the operator, which can cause increased hazard, have been insulated.

3.02 Location

Be sure to locate the welder according to the following guidelines:

- In areas, free from moisture and dust.
- Ambient temperature between 0 degrees C to 40 degrees C.
- In areas, free from oil, steam and corrosive gases.
- In areas, not subjected to abnormal vibration or shock.
- In areas, not exposed to direct sunlight or rain.
- Place at a distance of 12" (304.79mm) or more from walls or similar that could restrict natural airflow for cooling.



WARNING

CIGWELD advises that this equipment be electrically connected by a qualified electrician.

3.03 Electrical Input Connections



WARNING

ELECTRIC SHOCK can kill; SIGNIFICANT DC VOLTAGE is present after removal of input power.

DO NOT TOUCH live electrical parts.

SHUT DOWN welding power source, disconnect input power employing lockout/tagging procedures. Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

3.04 Mains Supply Voltage Requirements

The Mains supply voltage should be within $\pm 15\%$ of the rated Mains supply voltage. Too low a voltage may cause the fuse or circuit breaker to rupture due to the increased primary current. Too high a supply voltage will cause the Power Source to fail.

240V Mains Current Circuit Requirements for the Transtig 200 AC/DC

The Welding Power Source must be:

- Correctly installed, if necessary, by a qualified electrician.
- Correctly earthed (electrically) in accordance with local regulations.
- Connected to the correct size 240V Mains Current Circuit as per the Specifications



WARNING

CIGWELD advises that this equipment be electrically connected by a qualified electrical tradesperson.

The following 240V Mains Current Circuit recommendations are required to obtain the maximum welding current and duty cycle from this welding equipment:

NOTE

This product has been fitted with a 15 amp input supply plug as standard. In order to achieve maximum welding output and duty cycle, it is recommended to increase the rating of the supply plug as indicated below.

Motor start fuses or thermal circuit breakers are recommended for this application.

Model	Mains Supply Lead Size (Factory Fitted)	Minimum 240V Mains Current Circuit Size	Input Supply Plug Current Rating
Transtig 200 AC/DC	2.5 mm ²	36.7 Amps	25A

Table 3-1: 240V Mains Current Circuit recommendations

3.05 High Frequency Introduction

The importance of correct installation of high frequency welding equipment cannot be overemphasized. Interference due to high frequency initiated or stabilized arc is almost invariably traced to improper installation. The following information is intended as a guide for personnel installing high frequency welding machines.

**WARNING: EXPLOSIVES**

The high frequency section of this machine has an output similar to a radio transmitter. The machine should NOT be used in the vicinity of blasting operations due to the danger of premature firing.

**WARNING: COMPUTERS**

It is also possible that operation close to computer installations may cause computer malfunction.

3.06 High Frequency Interference

Interference may be transmitted by a high frequency initiated or stabilized arc welding machine in the following ways:

- 1. Direct Radiation:** Radiation from the machine can occur if the case is metal and is not properly grounded. It can occur through apertures such as open access panels. The shielding of the high frequency unit in the Power Source will prevent direct radiation if the equipment is properly grounded.
- 2. Transmission via the Supply Lead:** Without adequate shielding and filtering, high frequency energy may be fed to the wiring within the installation (mains) by direct coupling. The energy is then transmitted by both radiation and conduction. Adequate shielding and filtering is provided in the Power Source.
- 3. Radiation from Welding Leads:** Radiated interference from welding leads, although pronounced in the vicinity of the leads, diminishes rapidly with distance. Keeping leads as short as possible will minimize this type of interference. Looping and suspending of leads should be avoided where possible.
- 4. Re-radiation from Unearthed Metallic Objects:** A major factor contributing to interference is re-radiation from unearthed metallic objects close to the welding leads. Effective grounding of such objects will prevent re-radiation in most cases.

3.07 Duty Cycle

The duty cycle of a welding power source is the percentage of a ten (10) minute period that it can be operated at a given output without causing overheating and damage to the unit. If the welding amperes decrease, the duty cycle increases. If the welding amperes are increased beyond the rated output, the duty cycle will decrease.



WARNING

Exceeding the duty cycle ratings will cause the thermal overload protection circuit to become energized and shut down the output until the unit has cooled to normal operating temperature.



CAUTION

Continually exceeding the duty cycle ratings can cause damage to the welding power source and will void the manufacturer's warranty.

NOTE

Due to variations that can occur in manufactured products, claimed performance, voltages, ratings, all capacities, measurements, dimensions and weights quoted are approximate only. Achievable capacities and ratings in use and operation will depend upon correct installation, use, applications, maintenance and service.

SECTION 4:
OPERATOR CONTROLS

4.01 Transtig 200 AC/DC Controls

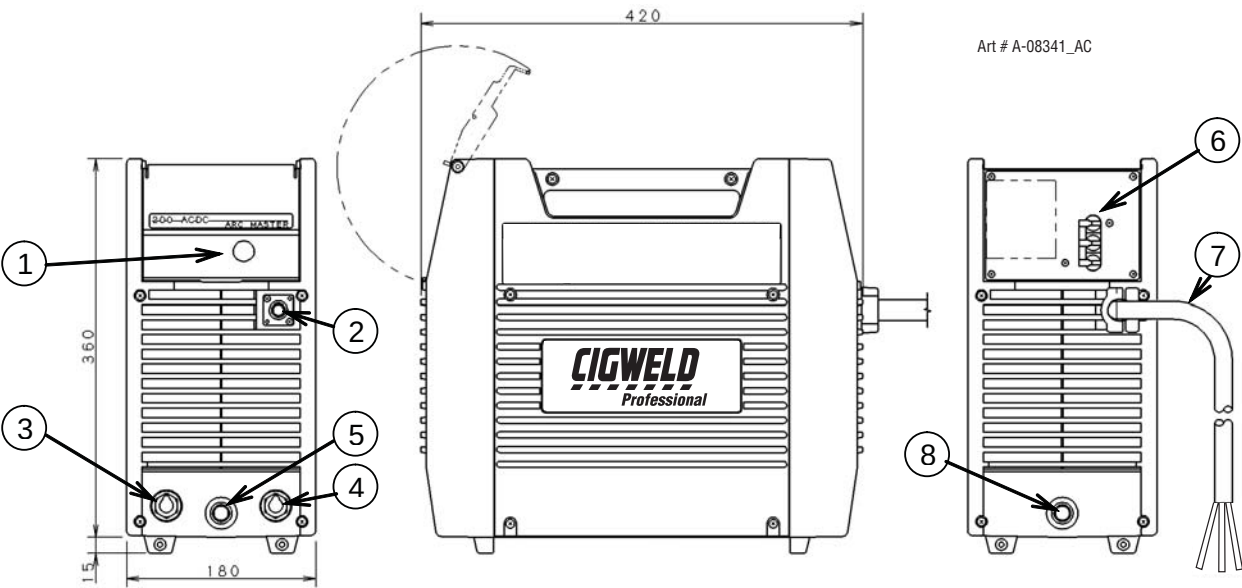


Figure 4-1: Transtig 200 AC/DC Power Source

1. **Control Knob:** This control sets the selected weld parameter, rotating it clockwise increases the parameter that is indicated on the digital meter. Pushing the knob inward displays the actual welding voltage.
2. **Remote Control Socket:** The 8 pin Remote Control Socket is used to connect remote current control devices to the welding Power Source. To make connections, align keyway, insert plug, and rotate threaded collar fully clockwise.

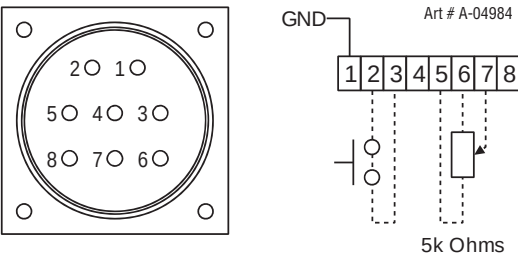


Figure 4-2: 8-Socket Receptacle

Socket Pin	Function
1	Earth (Ground)
2	Torch Switch Input (24V) to (connect pins 2 & 3 to turn on welding current)
3	Torch Switch Input (0V) to energize weld current (connect pins 2 & 3 to turn on welding current)
4	Not Used
5	5k ohm (maximum) connection to 5k ohm remote control potentiometer
6	Zero ohm (minimum) connection to 5k ohm remote control potentiometer
7	Wiper arm connection to 5k ohm remote control potentiometer
8	Not Used

Table 4-1: Socket Pin Functions

- 3. Positive Terminal:** Welding current flows from the Power Source via heavy duty Dinse type terminal. It is essential, however, that the male plug is inserted and turned securely to achieve a sound electrical connection.

- 4. Negative Terminal:** Welding current flows from the Power Source via heavy duty Dinse type terminal. It is essential, however, that the male plug is inserted and turned securely to achieve a sound electrical connection.

**CAUTION**

Loose welding terminal connections can cause overheating and result in the male plug being fused in the bayonet terminal.

- 5. Gas Outlet:** Torch / Gas Terminal is an all-in-one design of the Gas Outlet and the Negative Terminal. Gas Outlet is a 5/8-18 UNF female gas fitting.
- 6. ON/OFF Switch:** This switch connects the Primary supply voltage to the inverter when in the ON position. This enables the Power Supply.

**WARNING**

When the welder is connected to the Primary supply voltage, the internal electrical components may be at 240V potential with respect to earth.

- 7. Input Cable:** The input cable connects the Primary supply voltage to the equipment.
- 8. Gas Inlet:** The Gas Inlet is a 5/8-18 UNF female gas fitting.

4.02 Weld Process Selection for Transtig 200 AC/DC

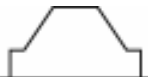
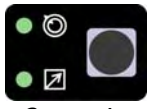
Weld Process Selection	Weld Mode			Description
	STICK	HF TIG	LIFT TIG	
 <i>STD</i>	Yes	Yes	Yes	2T operation in TIG Modes using remote devices to control contactor & current
 <i>SLOPE</i>	No	Yes	Yes	4T operation in TIG Modes with crater fill using a remote contactor device to control sequence.
 <i>REPEAT</i>	No	Yes	Yes	4T operation in TIG Modes with repeat operation and crater fill using a remote contactor device.
 <i>SPOT</i>	No	Yes	No	2T operation spot welding in HF TIG using a remote contactor device.
 <i>PULSE ON/OFF</i>	No	Yes	Yes	Pulse operation in TIG Modes
 <i>Operation</i> <i>PANEL/REMOTE</i>	Yes	Yes	Yes	Selects AC or DC weld current
 <i>Operation</i> <i>PANEL/REMOTE</i>	Yes	Yes	Yes	Selects mode of operation: Panel or Remote

Table 4-2: Weld Process selection versus Weld Mode for Transtig 200 AC/DC

4.03 Weld Parameter Descriptions for Transtig 200 AC/DC

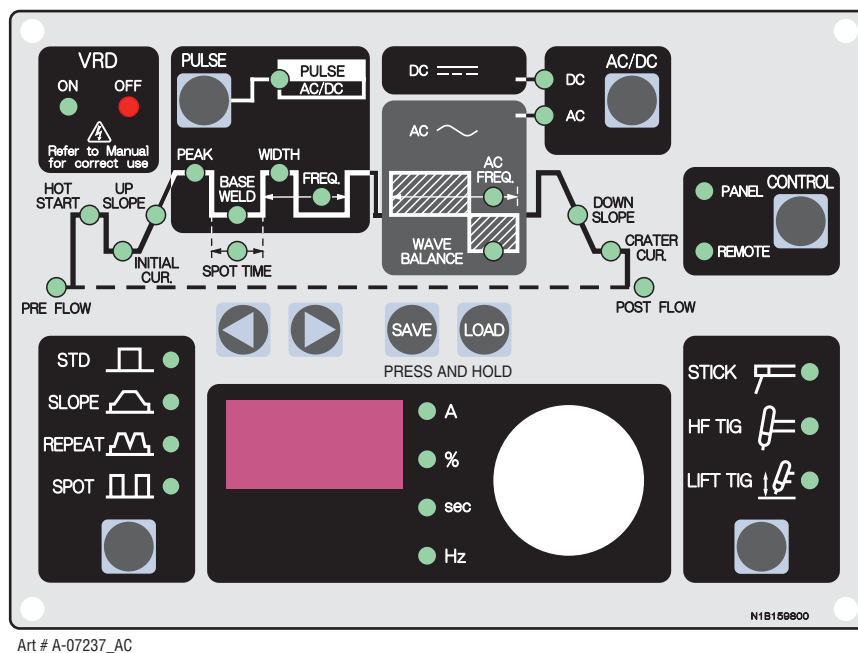


Figure 4-3: Transtig 200 AC/DC Front Panel

Parameter	Description
<i>PRE-FLOW</i>	This parameter operates in TIG modes only and is used to provide gas to the weld zone prior to striking the arc, once the torch trigger switch has been pressed. This control is used to dramatically reduce weld porosity at the start of a weld.
<i>HOT START</i>	This parameter operates in all weld modes except Lift TIG mode and is used to heat up the weld zone in TIG modes or improve the start characteristics for stick electrodes. e.g. low hydrogen electrodes. It sets the peak start current on top of the <i>BASE (WELD)</i> current. e.g. <i>HOT START</i> current = 130 amps when <i>BASE (WELD)</i> = 100 amps & <i>HOT START</i> = 30 amps
<i>INITIAL CUR.</i>	This parameter operates in <i>SLOPE</i> or <i>REPEAT</i> (4T) TIG modes only and is used to set the start current for TIG. The Start Current remains on until the torch trigger switch is released after it has been depressed.
<i>UP SLOPE</i>	This parameter operates in TIG modes only and is used to set the time for the weld current to ramp up, after the torch trigger switch has been pressed then released, from INITIAL CUR to PEAK or BASE current

Table 4-3: Transtig 200 AC/DC Front Panel Parameter Description

<i>PEAK CUR.</i>	This parameter sets the PEAK weld current when in <i>PULSE</i> mode
<i>WELD</i>	This parameter sets the TIG WELD current in <i>STD</i> , <i>SLOPE</i> , <i>REPEAT</i> and <i>SPOT</i> modes when <i>PULSE</i> is OFF. This parameter also sets the STICK weld current.
<i>BASE</i> (BackgroundCurrent)	This parameter sets the Background current when in Pulse TIG mode.
<i>SPOT TIME</i>	This parameter sets the duration of the <i>SPOT TIME</i> in <i>HF TIG</i> mode only
<i>PULSE WIDTH</i>	This parameter sets the percentage on time of the <i>PULSE FREQUENCY</i> for PEAK weld current when the <i>PULSE</i> is ON.
<i>PULSE FREQ.</i>	This parameter sets the <i>PULSE FREQUENCY</i> when the <i>PULSE</i> is ON.
<i>AC FREQUENCY</i>	This parameter operates in AC mode only and is used to set the frequency for the AC weld current.
<i>WAVE BALANCE</i>	This parameter is used for aluminum AC TIG mode and is used to set the penetration to cleaning action ratio for the AC weld current. Generally <i>WAVE BALANCE</i> is set to 50% for AC <i>STICK</i> welding. The <i>WAVE BALANCE</i> control changes the ratio of penetration to cleaning action of the AC TIG welding arc. Maximum weld penetration is achieved when the <i>WAVE BALANCE</i> control is set to 10%. Maximum cleaning of heavily oxidised aluminium or magnesium alloys is achieved when the <i>WAVE BALANCE</i> control is set to 65%. WAVE BALANCE=50% WAVE BALANCE=10% WAVE BALANCE=65%
<i>DOWN SLOPE</i>	This parameter operates in TIG modes only and is used to set the time for the weld current to ramp down, after the torch trigger switch has been pressed, to <i>CRATER CUR.</i> This control is used to eliminate the crater that can form at the completion of a weld.
<i>CRATER CUR.</i>	This parameter operates in <i>SLOPE</i> or <i>REPEAT</i> (4T) TIG modes only and is used to set the finish current for TIG. The CRATER Current remains ON until the torch trigger switch is released after it has been depressed.
<i>POST-FLOW</i>	This parameter operates in TIG modes only and is used to adjust the post gas flow time once the arc has extinguished. This control is used to dramatically reduce oxidation of the tungsten electrode.
	The SAVE/LOAD buttons are used to save and retrieve a total number of 5 programs into the 200AC/DC memory. Note: Press button for three seconds to store settings.

Table 4-3: Transtig 200 AC/DC Front Panel Parameter Description (cont.)

4.04 Weld Parameters for Transtig 200 AC/DC

Weld Parameter	Parameter Range	Factory Setting	Incremental Unit	Weld Mode		
				STICK	HF TIG	LIFT TIG
<i>PRE-FLOW</i>	0.0 to 1.0 sec	0.1 sec	0.1 sec	No	Yes	Yes
<i>HOT START</i>	0 to 70A	20A	1A	Yes	Yes	No
<i>INITIAL CUR.</i>	5 to 185A	30A	1A	No	Yes	Yes
<i>UP SLOPE</i>	0 to 15 sec	1 sec	0.1 sec	No	Yes	Yes
<i>PEAK CUR.</i>	5 to 185A	120A	1A	No	Yes	Yes
<i>WELD CUR (TIG)</i>	5 to 185A	80A	1A	No	Yes	Yes
<i>WELD CUR (STICK)</i>	5 to 160A	80A	1A	Yes	No	No
<i>SPOT TIME</i>	0.5 to 5.0 sec	2 sec	0.1 sec	No	Yes	Yes
<i>PULSE WIDTH</i>	15 to 80%	50%	1%	No	Yes	Yes
<i>PULSE FREQ.</i>	0.5 to 500Hz	100.0Hz	See Table 6	No	Yes	Yes
<i>AC FREQUENCY</i>	15 to 150Hz	50Hz	1Hz	Yes	Yes	Yes
<i>WAVE BALANCE</i>	10 to 65%	50%	1%	Yes	Yes	Yes
<i>DOWN SLOPE</i>	0 to 25 sec	3 sec	0.1 sec	No	Yes	Yes
<i>CRATER CUR.</i>	5 to 185A	30A	1A	No	Yes	Yes
<i>POST-FLOW</i>	0.0 to 60 sec	10 sec	0.1 sec	No	Yes	Yes

Table 4-4: Weld Parameters for Transtig 200 AC/DC

PULSE FREQ. Range	Incremental Unit
0.5 to 20Hz	0.1Hz
20 to 100Hz	1Hz
100 to 500Hz	5Hz

Table 4-5: PULSE FREQ. Range and Incremental Units

4.05 Power Source Features

Feature	Description
<i>New Digital Control</i>	Almost all welding parameters are adjustable
<i>Touch Panel Switches</i>	Touch switches eliminate mechanical damage
<i>Front Control Cover</i>	Protects front panel controls
<i>Digital Meter</i>	- Displays selected weld parameter value - Displays weld current when welding - Displays weld current for 20 seconds after weld has been completed - A selected weld parameter value can be adjusted at any time even while welding
<i>Intelligent Fan Control</i>	- The intelligent cooling system is designed to reduce dust and foreign material build-up, whilst providing optimum cooling - Fan speed reduces approximately 30 seconds after machine is turned on - Fan speed increases when internal components reaches operating temperature
<i>ON/OFF Switch</i>	Primary voltage Supply ON/OFF switch located on rear panel
<i>Voltage Reduction Device (VRD)</i>	Reduces the OCV when the power supply is not in use. Eliminates the need for add on voltage reducers and has no effect on arc starting. - VRD fully complies to AS 60974.1 - When Stick mode is selected the green VRD light is ON when not welding and red when welding - When in TIG modes VRD is OFF.
<i>Control Knob</i>	- For the selected weld parameter, rotating the knob clockwise increases the parameter - Rotating the knob counter-clockwise decreases the parameter - A selected weld parameter value can be adjusted at any time even while welding - Pushing the knob in displays actual arc voltage
<i>Self Diagnosis using Error Codes</i>	An error code is displayed on the <i>Digital Meter</i> when a problem occurs with Primary supply voltage or internal component problems. Refer to troubleshooting guide.

Table 4-6: Power Source Features

Feature	Description
<i>Save/Load Function</i>	- A total number of 5 programs can be saved into the 200 AC/DC memory. <i>SAVE the Current Weld Parameters into Memory</i> - Press and HOLD the <i>SAVE</i> button for three seconds. Beep will sound and the Digital Meter will show a number 1. - Select a memory location by rotating the control knob, 1 to 5 is displayed on the meter. - After selecting the desired memory location (i.e. 1 to 5), press the right scroll button and the machine will give a beep to confirm the weld parameters from the control panel are saved. <i>LOAD (retrieve) a Program to Control Panel</i> - Press and HOLD the <i>LOAD</i> button for three seconds. Beep will sound and the Digital Meter display will show a number 1. - Select a memory location by rotating the control knob, 1 to 5 is displayed on the meter. After selecting the desired memory location (i.e. 1 to 5), press the right scroll button and the machine will give a beep to confirm the weld parameters are loaded onto the control panel.

Table 4-6:Power Source Features (cont.)

SECTION 5:

SET-UP FOR SMAW (STICK) AND GTAW (TIG)

Conventional operating procedures apply when using the Welding Power Source, i.e. connect work lead directly to work piece and electrode lead is used to hold electrode. Wide safety margins provided by the coil design ensure that the Welding Power Source will withstand short-term overload without adverse effects. The welding current range values should be used as a guide only. Current delivered to the arc is dependent on the welding arc voltage, and as welding arc voltage varies between different classes of electrodes, welding current at any one setting would vary according to the type of electrode in use. The operator should use the welding current range values as a guide, then finally adjust the current setting to suit the application.

**WARNING**

Before connecting the work clamp to the work and inserting the electrode in the electrode holder make sure the Primary power supply is switched off.

**CAUTION**

Remove any packaging material prior to use. Do not block the air vents at the front or rear or sides of the Welding Power Source.

**CAUTION**

DO NOT change the Weld Mode or Weld Process Mode until after POST-FLOW time has finished.

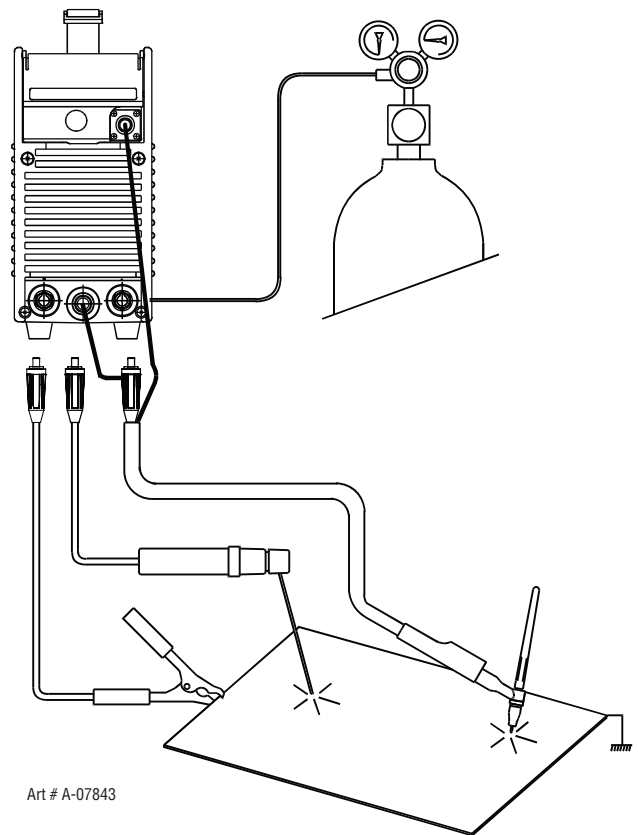
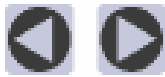


Figure 5-1: Transtig 200 AC/DC Set-up

NOTES

SECTION 6: SEQUENCE OF OPERATION



Scroll Buttons are used to select the parameters to be set. The LED's show which function is being adjusted on the weld sequence graph. Refer to the Symbols Table located in the front of the manual for Symbol descriptions.

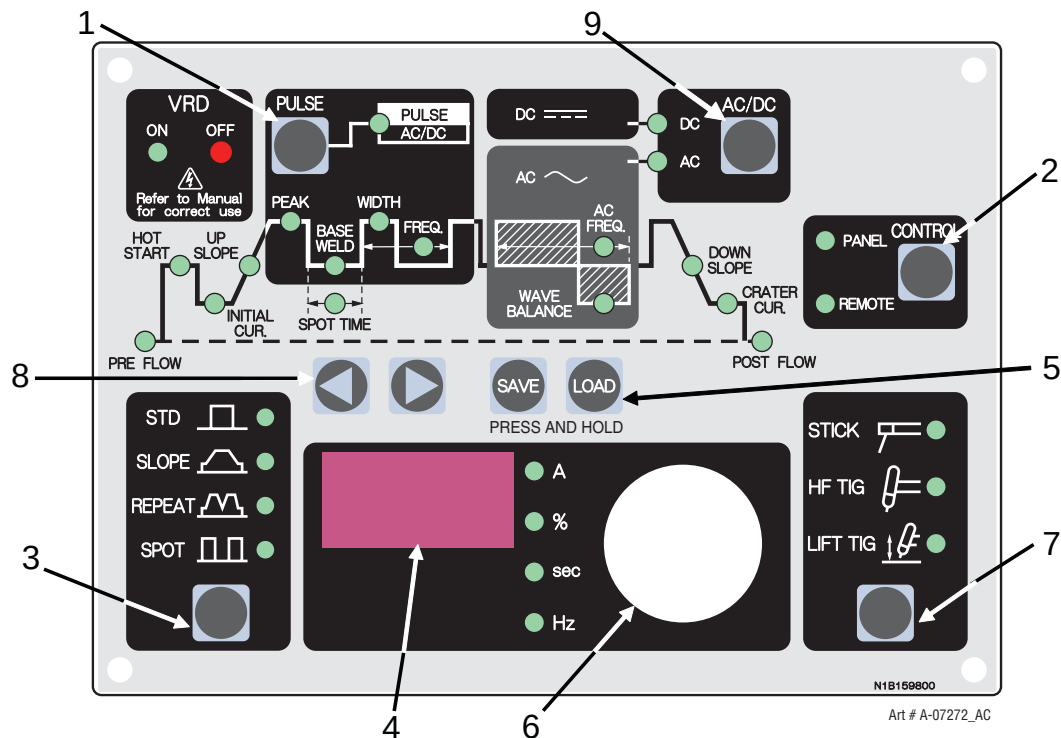


Figure 6-1: Transtig 200 AC/DC Front Panel

1. **Pulse Function:** Pressing this button enables the TIG current pulse functions.
2. **Remote Current Function:** Pressing this buttons enables remote current functions.
3. **TIG Mode Functions:** Pressing this button scrolls through the output TIG function modes (Standard, Slope, Slope w/repeat, Spot).
4. **Digital LED Display:** Welding amperage and parameter values are displayed in this window. Internal warnings such as over temperature, low or high input voltage applied are signaled to the operator by a warning sound and error message on the screen.
5. **Save/Load Buttons:** By using the Save & Load buttons the operator can easily save up to five welding parameter programs. The buttons must be pressed for three seconds to store the settings.
6. **Control Knob:** Allows the operator to adjust the output amperage within the entire range of the power source and sets each parameter value.
7. **Process Button:** This button selects between STICK, HF TIG and Lift TIG mode.
8. **Scroll Buttons:** Used to select the parameters to be set. The LED's show which function is being adjusted on the Sequence Graph.
9. **AC/DC Button:** Selects between AC or DC welding output.

6.01 Stick Welding

- *Connect work lead to negative terminal*
- *Connect electrode lead to positive terminal*
- *Switch machine on*
- *Set AC or DC weld current. If AC is selected then set AC FREQ to 60Hz & WAVE BALANCE to 50%.*
- *Set Contractor*
- *Connect remote control device if required*

Use the Scroll Buttons to move to the parameter to be set. The LED will show which function is being adjusted on the weld sequence graph. Use the control knob to adjust each parameter.

- *Set HOT START*
- *Set WELD current*

Commence welding

6.02 AC or DC HF TIG Welding

- *Connect work lead to positive terminal*
- *Connect TIG torch to gas terminal*
- *Switch machine on*
- *Set AC or DC weld current. If AC is selected then set AC FREQ & WAVE BALANCE*
- *Connect remote control device if required*

Use the Scroll Buttons to move to the parameter to be set. The LED will show which function is being adjusted on the weld sequence graph. Use the control knob to adjust each parameter.

- *Set PRE-FLOW time*
- *Set HOT START current*
- *Set POST-FLOW time*
- *Set (WELD) PEAK CUR current*
- *Set POST-FLOW time*

Slope Mode Parameters if required

- *Set INITIAL CUR current*
- *Set UP SLOPE time*
- *Set (WELD) PEAK CUR current*
- *Set BASE current*
- *Set DOWN SLOPE time*
- *Set CRATER CUR current*

Pulse Mode parameters if required

- *Set PULSE WIDTH % for PEAK CURRENT*
- *Set PEAK CURRENT*
- *Set PULSE FREQ*

Commence welding

6.03 Slope Mode Sequence

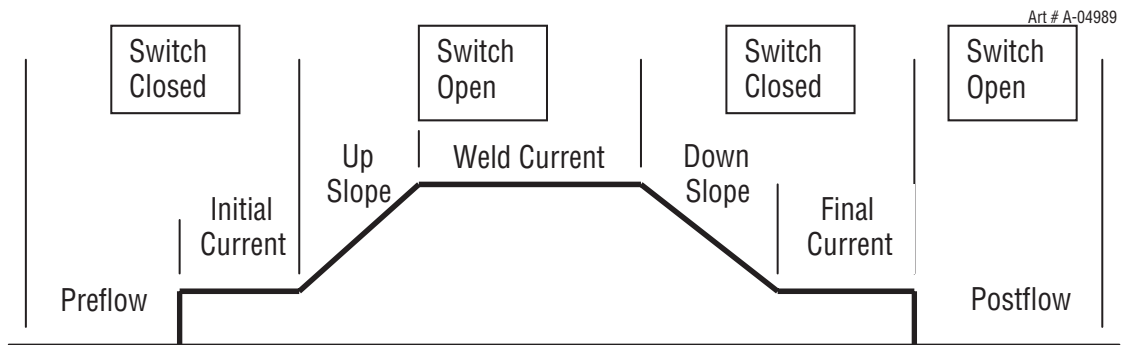


Figure 6-2: Slope Mode Sequence

NOTE

Slope function operates with a Remote ON/OFF device only

1. To start Slope sequence Close remote switch contacts. Once the welding arc is established the Power Source will maintain initial current setting as long as the remote switch contacts are closed.
 - a. In the HF TIG mode, after Prewflow time, High Frequency is present at the torch. When the torch is positioned close to the work the welding current will transfer to the work and establish the arc at the initial current setting.
 - b. In the Lift TIG mode, after Prewflow time, Lift Start current is present at the torch. When the electrode is touched to the work and lifted off, the welding arc is established at the initial current setting.
2. Open Remote Switch – current increases to weld current. Once welding arc has reached weld current the power source will maintain weld current as long as the remote switch contacts are open.
3. Close Remote Switch – Welding current decreases to final current setting. Once final welding current is reached the power source will maintain final current setting as long as the remote switch contacts are closed.
4. Open Remote Switch – Welding arc stops and post flow begins.

6.04 Slope Mode with Repeat Sequence

The repeat function is operated during the down slope cycle of the Slope Sequence and is active through the down slope period only. During the down slope period, by opening the Remote Switch contacts, the current will increase back to weld current. Within the Down Slope period the repeat function can be operated as many times as desired. To continue slope cycle and end slope sequence close remote switch contacts and allow weld current to reach final current setting. Once final current setting is reached, opening the Remote Switch again will turn off the welding arc and post flow begins.

6.05 Pulse Controls

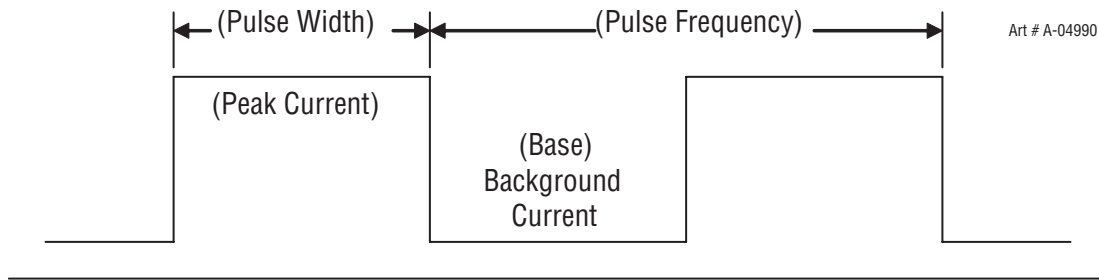


Figure 6-3: Pulse Controls

The Pulse controls are used primarily to control heat input. Pulse offers a number of advantages as follows:

- 1) Control puddle – size and fluidity (especially out of position).
- 2) Increase penetration
- 3) Travel speed control
- 4) Better consistent quality
- 5) Decreased distortion on lighter or thinner materials

Pulse-current provides a system in which the welding current continuously changes between two levels. During the periods of Peak current, heating and fusion takes place, and during the background (base) current periods, cooling and solidification take place. Pulse Width is the time in one cycle the current remains at the peak current setting. Pulse Frequency, measured in Hertz, is the number of cycles per second the current travels between peak and background current settings. It is as if the foot rheostat were moved up and down to increase and decrease the welding current on a regular basis. The faster you moved the foot rheostat up and down the faster the frequency.

SECTION 7: BASIC TIG WELDING GUIDE

7.01 Explanation of “Fluttery Arc” when AC TIG Welding on Aluminum

The following will assist in understanding the phenomenon of Arc Flutter, also referred to as Arc Rectification.

The basic thesis is that the fluttering is caused by lack of oxide in the weld pool.

The oxide layer on the plate reduced the energy for electron emission. Electron emission from the weld pool (DC+) causes the oxide layers to be disrupted, the so-called “cleaning action”. However once the cleaning action has produced a mirror like surface on the weld pool, the effect of the oxide layer is limited because the oxide layer has dissipated. This makes electron emission from the weld pool more difficult and increases the chance of arc instability.

This idea is supported by the observation that once fluttering starts it can be made to stop by working the arc away from the mirror like weld pool to an area of oxide coated material. As soon as this is done the arc settles back to a stable condition. So while the arc is “consuming” oxide coated plate the instability does not occur. But once the arc is stationary, the pool becomes thoroughly “cleaned” by electron emission, the fluttering begins.

Tests conducted on various types of AC TIG power sources, Fluttery Arc is not confined to one type of power source or its' design, both conventional and inverter types suffer from the same problem.

AC TIG on aluminum

1. The Problem: Arc appears unstable and pulses or flutters. ie. appears to rapidly change welding current.

Conditions that accentuate arc flutter:	Conditions that minimizes arc flutter:
• Cold work piece	• Preheat the work piece
• Very short arc length	• Increase the arc length
• Weld pool crater about 0.39” to 0.47” (10 to 12mm) diameter	• Introduce filler rod material to the weld pool, which introduces oxides
• Arc field in one spot to produce “mirror” clean weld pool	• Move the weld pool around to introduce oxides to the weld pool
• Increased cleaning action i.e. Prolonged oxide emission from a stationary weld pool increases the likelihood of arc flutter	• Decrease the cleaning action by turning the <i>WAVE BALANCE</i> to below 50% or move the weld pool around
• Accentuated when tungsten running near its current capacity, i.e. Molten ball on end	• Use a larger diameter tungsten electrode

Table 7-1: Reduction of Arc Flutter

2. Conclusion: Fluttery Arc in AC TIG is a physical phenomenon independent of machine design.

7.02 Electrode Polarity

Connect the TIG torch to the - / TORCH terminal and the work lead to the + / WORK terminal for direct current straight polarity. Direct current straight polarity is the most widely used polarity for DC TIG welding. It allows limited wear of the electrode since 70% of the heat is concentrated at the work piece.

7.03 Tungsten Electrode Current Ranges

Electrode Diameter	AC Current (Amps)	DC Current (Amps)
0.040" (1.0mm)	30 – 70	30 – 60
1/16" (1.6mm)	60 – 95	60 – 115
3/32" (2.4mm)	125 – 150	100 – 165
1/8" (3.2mm)	130 – 225	135 – 200
5/32" (4.0mm)	190 – 280	190 – 280
3/16" (4.8mm)	250 – 340	250 – 340

Table 7-2: Current ranges for various tungsten electrode sizes

7.04 Tungsten Electrode Types

Electrode Type (Ground Finish)	Welding Application	Features	Color Code
Thoriated 2%	DC welding of mild steel, stainless steel and copper	Excellent arc starting, long life, high current carrying capacity	Red
Zirconated 1%	High quality AC welding of aluminium, magnesium and their alloys	Self cleaning, long life, maintains balled end, high current carrying capacity	White
Ceriated 2%	AC & DC welding of mild steel, stainless steel, copper, aluminium, magnesium and their alloys	Longer life, more stable arc, easier starting, wider current range, narrower more concentrated arc	Grey

Table 7-3: Tungsten Electrode Types

7.05 Guide for Selecting Filler Wire Diameter

NOTE

The filler wire diameter specified in Table 7-4 is a guide only, other diameter wires may be used according to the welding application

Filler Wire Diameter	AC Current Range (Amps)	DC Current Range (Amps)
1/16" (1.6 mm)	30-95	20 - 90
3/32" (2.4 mm)	125-160	65 - 115
1/8" (3.2 mm)	180-240	100 - 165
3/16" (4.8 mm)	220-320	200-350

Table 7-4: Filler Wire Selection Guide

7.06 Shielding Gas Selection

Alloy	Shielding Gas
Aluminium & alloys	Welding Argon
Carbon Steel	Welding Argon
Stainless Steel	Welding Argon
Copper	Welding Argon

Table 7-5: Shielding Gas Selection

7.07 TIG Welding Parameters for Low Carbon & Low Alloy Steel Pipe

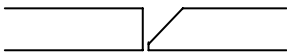
Electrode Type & Diameter	Current Range DC Amperes	Filler Rod for Root Pass	Joint Preparation
Thoriated 2% 3/32" (2.4 mm)	120 - 170	Yes	
Thoriated 2% 3/32" (2.4 mm)	100 - 160	Yes	
Thoriated 2% 3/32" (2.4 mm)	90 - 130	No	

Table 7-6: TIG Welding Parameters for Low Carbon & Low Alloy Steel Pipe

7.08 Welding Parameters for Aluminum

Base Metal Thickness	AC Current for Aluminum	Tungsten Electrode Diameter	Filler Rod Diameter (if required)	Argon Gas Flow Rate Liters/min	Joint Type
0.040" 1.0mm	30-45 35-50	0.040" 1.0mm	1/16" 1.6mm	5-7	Butt/Corner Lap/ Fillet
0.045" 1.2mm	40-60 45-70	0.040" 1.0mm	1/16" 1.6mm	5-7	Butt/Corner Lap/ Fillet
1/16" 1.6mm	60-85 70-95	1/16" 1.6mm	1/16" 1.6mm	7	Butt/Corner Lap/ Fillet
1/8" 3.2mm	125-150 130-160	3/32" 2.4mm 1/8" 3.2mm	3/32" 2.4mm	10	Butt/Corner Lap/Fillet
3/16" 4.8mm	180-225 190-240	1/8" 3.2mm	1/8" 3.2mm	10	Butt/Corner Lap/ Fillet
1/4" 6.4mm	240-280 250-320	3/16" 4.8mm	3/16" 4.8mm	13	Butt/Corner Lap/ Fillet

Table 7-7: AC TIG Welding Parameters

7.09 Welding Parameters for Steel

Base Metal Thickness	DC Current for Mild Steel	DC Current for Stainless Steel	Tungsten Electrode Diameter	Filler Rod Diameter (if required)	Argon Gas Flow Rate Liters/min	Joint Type
0.040" 1.0mm	35-45 40-50	20-30 25-35	0.040" 1.0mm	1/16" 1.6mm	5-7	Butt/Corner Lap/ Fillet
0.045" 1.2mm	45-55 50-60	30-45 35-50	0.040" 1.0mm	1/16" 1.6mm	5-7	Butt/Corner Lap/ Fillet
1/16" 1.6mm	60-70 70-90	40-60 50-70	1/16" 1.6mm	1/16" 1.6mm	7	Butt/Corner Lap/ Fillet
1/8" 3.2mm	80-100 90-115	65-85 90-110	1/16" 1.6mm	3/32" 2.4mm	7	Butt/Corner Lap/ Fillet
3/16" 4.8mm	115-135 140-165	100-125 125-150	3/32" 2.4mm	1/8" 3.2mm	10	Butt/Corner Lap/ Fillet
1/4" 6.4mm	160-175 170-200	135-160 160-180	1/8" 3.2mm	5/32" 4.0mm	10	Butt/Corner Lap/ Fillet

Table 7-8: DC TIG Welding Parameters

SECTION 8: BASIC ARC WELDING GUIDE

8.01 Electrode Polarity

Stick electrodes are generally connected to the '+' terminal and the work lead to the '-' terminal but if in doubt consult the electrode manufacturers literature.

8.02 Effects of Stick Welding Various Materials

High Tensile and Alloy Steels

The two most prominent effects of welding these steels are the formation of a hardened zone in the weld area, and, if suitable precautions are not taken, the occurrence in this zone of under-bead cracks. Hardened zone and under-bead cracks in the weld area may be reduced by using the correct electrodes, preheating, using higher current settings, using larger electrodes sizes, short runs for larger electrode deposits or tempering in a furnace.

Manganese Steels

The effect on manganese steel of slow cooling from high temperatures is to embrittle it. For this reason it is absolutely essential to keep manganese steel cool during welding by quenching after each weld or skip welding to distribute the heat.

Cast Iron

Most types of cast iron, except white iron, are weldable. White iron, because of its extreme brittleness, generally cracks when attempts are made to weld it. Trouble may also be experienced when welding white-heart malleable, due to the porosity caused by gas held in this type of iron.

Copper and Alloys

The most important factor is the high rate of heat conductivity of copper, making preheating of heavy sections necessary to give proper fusion of weld and base metal.

Types of Electrodes

Arc Welding electrodes are classified into a number of groups depending on their applications. There are a great number of electrodes used for specialized industrial purposes, which are not of particular interest for everyday general work. These include some low hydrogen types for high tensile steel, cellulose types for welding large diameter pipes, etc. The range of electrodes dealt with in this publication will cover the vast majority of applications likely to be encountered; are all easy to use and all will work on even the most basic of welding machines.

Metals being joined	Electrode	Comments
Mild Steel	6013	Ideal electrodes for all general purpose work. Features include outstanding operator appeal, easy arc starting and low spatter.
Mild Steel	7014	All positional electrode for use on mild and galvanized steel furniture, plates, fences, gates, pipes and tanks etc. Especially suitable for vertical-down welding.
Cast Iron	99% Nickel	Suitable for joining all cast irons except white cast iron.
Stainless Steel	318L-16	High corrosion resistance. Ideal for dairy work, etc.
Copper, Bronze, Brass, etc.	Bronze 5.7 ERCUSI-A	Easy to use electrode for marine fittings, water taps and valves, water trough float arms, etc. Also for joining copper to steel and for bronze overlays on steel shafts.
High alloy steels, dissimilar metals, crack resistant, all hard-to-weld jobs.	312-16	It will weld most problematic jobs such as springs, shafts, broken joints, mild steel to stainless and alloy steel. Not suitable for Aluminium.

Table 8-1: Types of Electrodes

SECTION 9: ROUTINE MAINTENANCE

The only routine maintenance required for the power supply is a thorough cleaning and inspection, with the frequency depending on the usage and the operating environment.

The unit should be wiped clean as necessary with solvents that are recommended for cleaning electrical apparatus. Turn Power Switch to OFF before proceeding. Internal cleaning of the unit should be done every 6 months by an authorized CIGWELD Service Center to remove any accumulated dirt and dust. This may need to be done more frequently under exceptionally dirty conditions.



CAUTION

Do not blow air into the power supply during cleaning. Blowing air into the unit can cause metal particles to interfere with sensitive electrical components and cause damage to the unit.

**Warning!**

Disconnect input power before maintaining.

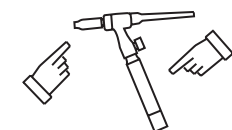
Maintain more often if used under severe conditions

Each Use

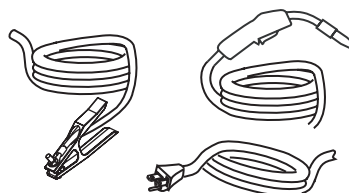
Visual check of
regulator and pressure



Visual check of torch
Consumable parts

**Weekly**

Visually inspect the torch
body and consumables



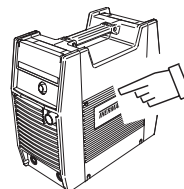
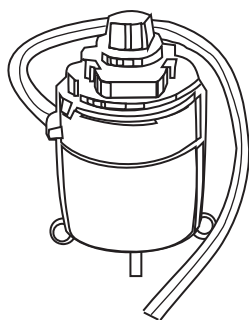
Visually inspect the
cables and leads.
Replace as needed

3 Months

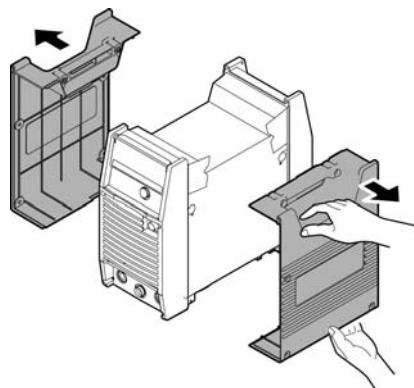
Replace all
broken parts



Clean
exterior
of power supply

**6 Months**

Bring the unit to an authorized
CIGWELD Service Provider
to remove any accumulated dirt
and dust from the interior.
This may need to be done more
frequently under exceptionally
dirty conditions.



Art # A-07681_AC

SECTION 10: BASIC TROUBLESHOOTING



WARNING

There are extremely dangerous voltages and power levels present inside this product. Do not attempt to open or repair unless you are an accredited CIGWELD Service Provider and you have had training in power measurements and troubleshooting techniques.

If major complex subassemblies are faulty, then the Welding Power Source must be returned to an accredited CIGWELD Service Provider for repair.

The basic level of troubleshooting is that which can be performed without special equipment or knowledge.

10.01 TIG Welding Problems

Weld quality is dependent on the selection of the correct consumables, maintenance of equipment and proper welding technique.

Description	Possible Cause	Remedy
1 Excessive bead build-up or poor penetration or poor fusion at edges of weld.	Welding current is too low.	Increase weld current and/or faulty joint preparation.
2 Weld bead too wide and flat or undercut at edges of weld or excessive burn through.	Welding current is too high.	Decrease weld current.
3 Weld bead too small or insufficient penetration or ripples in bead are widely spaced apart.	Travel speed too fast.	Reduce travel speed.
4 Weld bead too wide or excessive bead build up or excessive penetration in butt joint.	Travel speed too slow.	Increase travel speed.
5 Uneven leg length in fillet joint.	Wrong placement of filler rod.	Re-position filler rod.

Table 10-1: TIG Welding Problems

Description	Possible Cause	Remedy
6 Electrode melts when arc is struck.	A Electrode is connected to the '+' terminal. B <i>WAVE BALANCE</i> is greater than 50%.	A Connect the electrode to the '-' terminal. B Reduced <i>WAVE BALANCE</i> to below 50% or increase the electrode size.
7 Dirty weld pool.	A Electrode contaminated through contact with work piece or filler rod material. B Gas contaminated with air.	A Clean the electrode by grinding off the contaminates. B Check gas lines for cuts and loose fitting or change gas cylinder.
8 Electrode melts or oxidizes when an arc is struck.	A No gas flowing to welding region. B Torch is clogged with dust. C Gas hose is cut. D Gas passage contains impurities. E Gas regulator turned OFF. F Torch valve is turned OFF. G The electrode is too small for the welding current. H <i>WAVE BALANCE</i> is set above 50%.	A Check the gas lines for kinks or breaks and gas cylinder contents. B Clean torch. C Replace gas hose. D Disconnect gas hose from torch then raise gas pressure and blow out impurities. E Turn ON. F Turn ON. G Increase electrode diameter or reduce the welding current. H Reduced <i>WAVE BALANCE</i> to below 50% or increase the electrode size.
9 Poor weld finish.	Inadequate shielding gas.	Increase gas flow or check gas line for gas flow problems.
10 Arc flutters during TIG welding.	A Tungsten electrode is too large for the welding current. B Absence of oxides in the weld pool.	A Select the right size electrode. Refer to Basic TIG Welding guide. B Refer Basic TIG Welding Guide for ways to reduce arc flutter.

Table 10-1 (continued): TIG Welding Problems

Description	Possible Cause	Remedy
11 Welding arc cannot be established.	A Work clamp is not connected to the work piece or the work/torch leads are not connected to the right welding terminals. B Torch lead is disconnected. C Gas flow incorrectly set, cylinder empty or the torch valve is OFF.	A Connect the work clamp to the work piece or connect the work/torch leads to the right welding terminals. B Connect it to the '—' terminal. C Select the right flow rate, change cylinders or turn torch valve ON.
12 Arc start is not smooth.	A Tungsten electrode is too large for the welding current. B The wrong electrode is being used for the welding job. C Gas flow rate is too high. D Incorrect shielding gas is being used. E Poor work clamp connection to work piece.	A Select the right size electrode. Refer to Basic TIG Welding Guide. B Select the right electrode type. Refer to Basic TIG Welding Guide. C Select the correct rate for the welding job. Refer to Basic TIG Welding Guide. D Select the right shielding gas. Refer to Basic TIG Welding Guide. E Improve connection to work piece.

Table 10-1 (continued): TIG Welding Problems

10.02 Stick Welding Problems

Description	Possible Cause	Remedy
1 Gas pockets or voids in weld metal (Porosity).	A Electrodes are damp. B Welding current is too high. C Surface impurities such as oil, grease, paint, etc.	A Dry electrodes before use. B Reduce welding current. C Clean joint before welding.
2 Crack occurring in weld metal soon after solidification commences.	A Rigidity of joint. B Insufficient throat thickness. C Cooling rate is too high.	A Redesign to relieve weld joint of severe stresses or use crack resistance electrodes. B Travel slightly slower to allow greater build up in throat. C Preheat plate and cool slowly.
3 A gap is left by failure of the weld metal to fill the root of the weld.	A Welding current is too low. B Electrode too large for joint. C Insufficient gap. D Incorrect sequence.	A Increase welding current B Use smaller diameter electrode. C Allow wider gap. D Use correct build-up sequence.

Table 10-2: Stick Welding Problems

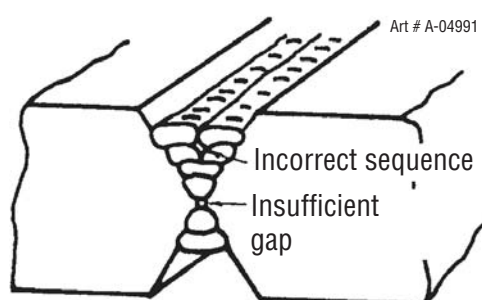


Figure 10-1: Example of Insufficient Gap or Incorrect Sequence

Description	Possible Cause	Remedy
4 Portions of the weld run do not fuse to the surface of the metal or edge of the joint.	A Small electrodes used on heavy cold plate. B Welding current is too low. C Wrong electrode angle. D Travel speed of electrode is too high. E Scale or dirt on joint surface.	A Use larger electrodes and pre-heat the plate. B Increase welding current. C Adjust angle so the welding arc is directed more into the base metal. D Reduce travel speed of electrode. E Clean surface before welding.

Table 10-2 (continued): Stick Welding Problems

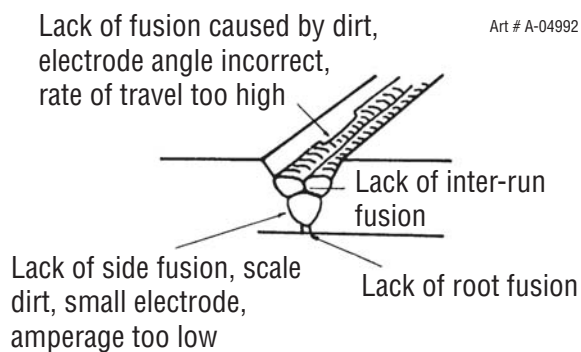


Figure 10-2: Example of Lack of Fusion

Description	Possible Cause	Remedy
5 Non-metallic particles are trapped in the weld metal (slag inclusion).	A Non-metallic particles may be trapped in undercut from previous run.	A If bad undercut is present, clean slag out and cover with a run from a smaller diameter electrode.
	B Joint preparation too restricted.	B Allow for adequate penetration and room for cleaning out the slag.
	C Irregular deposits allow slag to be trapped.	C If very bad, chip or grind out irregularities.
	D Lack of penetration with slag trapped beneath weld bead.	D Use smaller electrode with sufficient current to give adequate penetration. Use suitable tools to remove all slag from corners.
	E Rust or mill scale is preventing full fusion.	E Clean joint before welding.
	F Wrong electrode for position in which welding is done.	F Use electrodes designed for position in which welding is done, otherwise proper control of slag is difficult.

Table 10-2 (continued): Stick Welding Problems

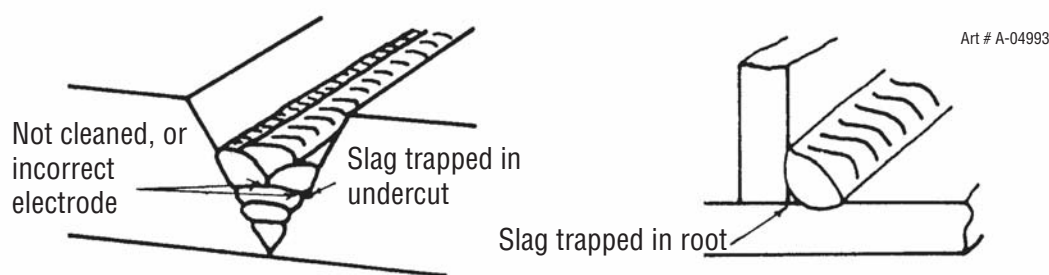


Figure 10-3: Examples of Slag Inclusion

10.03 Power Source Problems

Description	Possible Cause	Remedy
1 The welding arc cannot be established.	A The Primary supply voltage has not been switched ON. B The Welding Power Source switch is switched OFF. C Loose connections internally.	A Switch ON the Primary supply voltage. B Switch ON the Welding Power Source. C Have an accredited CIGWELD Service Provider repair the connection.
2 Maximum output welding current can not be achieved with nominal Mains supply voltage.	Defective control circuit.	Have an accredited CIGWELD Service Provider repair the connection.
3 Welding current reduces when welding.	A Loose welding cable connections. B Incorrect welding cable size. C Improper input connections. D Poor electrode condition. E Wrong welding polarity.	A Tighten all welding cable connections. B Use proper size and type of cable. C Refer to Section 2.05 Electrical Input Requirements. D Replace electrode. E Verify output torch connections.
4 No gas flow when the torch trigger switch is depressed.	A Gas hose is cut. B Gas passage contains impurities. C Gas regulator turned OFF. D Torch trigger switch lead is disconnected or switch/cable is faulty.	A Replace gas hose. B Disconnect gas hose from the rear of Power Source then raise gas pressure and blow out impurities. C Turn gas regulator ON. D Reconnect lead or repair faulty switch/cable.

Table 10-3: Power Source Problems

Description	Possible Cause	Remedy
5 Gas flow won't shut OFF.	A Weld Mode (<i>STD</i>, <i>SLOPE</i>, <i>REPEAT</i> or <i>SPOT</i>) was changed before <i>POST-FLOW</i> gas time had finished. B Gas valve is faulty. C Gas valve jammed open. D <i>POST-FLOW</i> control is set to 60 sec.	A Strike an arc to complete the weld cycle. OR Switch machine OFF then ON to reset solenoid valve sequence. B Have an accredited CIGWELD Service Agent Provider or replace the gas valve. C Have an accredited CIGWELD Service Provider repair or replace the gas valve. D Reduce <i>POST-FLOW</i> time.
6 The TIG electrode has been contaminated due to the gas flow shutting OFF before the programmed <i>POST-FLOW</i> time has elapsed.	The Weld Process Mode (STICK, HF TIG or LIFT TIG) was changed before <i>POST-FLOW</i> gas time had finished.	Do not change Weld Process Mode before the <i>POST-FLOW</i> gas time had finished.

Table 10-3 (continued): Power Source Problems

10.04 Power Source Error Codes

Description	Possible Cause	Remedy	Remarks
1 E01 error code displayed. Temperature sensor TH1 (protects IGBTs) is greater than 80°C for about 1 second.	A The Welding Power Source's duty cycle has been exceeded. B Fan ceases to operate. C Air flow is restricted by vents being blocked.	A Let Power Source cool down then keep within its duty cycle. B Have an Accredited Cigweld Service Provider investigate. C Unblock vents then let Power Source cool down.	Weld current ceases. Buzzer sounds constantly. E01 resets when TH1 decreases to 70°C for about 30 seconds.
2 E02 error code displayed. Temperature sensor TH2 (protects IGBTs) is greater than 90°C for about 1 second.	A The Welding Power Source's duty cycle has been exceeded. B Fan ceases to operate. C Air flow is restricted by vents being blocked.	A Let Power Source cool down then keep within its duty cycle. B Have an Accredited Cigweld Service Provider investigate. C Unblock vents then let Power Source cool down.	Weld current ceases. Buzzer sounds constantly. E02 resets when TH2 decreases to 70°C for about 30 seconds.
3 E03 error code displayed. Primary (input) current too high.	A Primary current too high because welding arc is too long B Mains supply voltage is more than 10% below nominal voltage	A Reduce length of welding arc B Have an Accredited Cigweld Service Provider or a qualified electrician check for low Mains voltage.	Weld current ceases. Buzzer sounds constantly. Switch machine off then on to reset E03 error.
4 E11 error code displayed. Over Primary supply (input) voltage at primary capacitors is exceeded for one second.	Primary supply voltage is greater than the nominal voltage plus 10%.	Have an Accredited Cigweld Service Provider or a qualified electrician check the Primary voltage.	Weld current ceases. Buzzer sounds constantly. Error code E11 automatically will reset when the voltage reduces.
5 E12 error code displayed. Under mains supply (input) voltage warning primary capacitors is reduced for one second.	Mains supply voltage is down to a dangerously low level.	Have an Accredited Cigweld Service Provider or a qualified electrician check the Mains voltage. Have an Accredited Cigweld Service Provider or a qualified electrician check the primary cable & fuses.	Weld current ceases. Buzzer sounds constantly. Error code E12 will automatically reset when the voltage increases.

10.04 Power Source Error Codes (con't)

Description	Possible Cause	Remedy	Remarks
6 E14 error code displayed. Under mains supply (input) voltage warning primary capacitors is reduced for one second.	Mains supply voltage is less than the nominal operating voltage plus 10%.	Have an Accredited Cigweld Service Provider or a qualified electrician check the Mains voltage.	Weld current available. Buzzer sounds intermittently. Error code E14 will automatically reset when the voltage increases.
7 E81 error code displayed. Wrong Primary supply (input) voltage connected.	When 3 phase machine is first turned on with the wrong Primary supply (input) voltage connected.	Have an Accredited Cigweld Service Provider check the Mains voltage.	No weld current is available. Buzzer sounds constantly. Switch machine off.
8 E82 error code displayed. Link switch plug not connected.	Link switch plug not connected.	Have an Accredited Cigweld Service Provider or a qualified electrician check the connector plug on input PCB.	No weld current is available. Buzzer sounds constantly. Switch machine off.
9 E83 error code displayed. CPU checks mains supply (input) voltage when the on/off switch on rear panel of machine is turned ON.	The Primary supply (input) voltage fluctuates and is not stable.	Have an Accredited Cigweld Service Provider or a qualified electrician check the connector plug on the input PCB and the Mains voltage.	No weld current is available. Buzzer sounds constantly. Switch machine off then on to reset E83 error.
10 E93 error code displayed. Memory chip (EEPROM) on control PCB can not read/write weld parameters.	Memory chip (EEPROM) error.	Have an Accredited Cigweld Service Provider or a qualified electrician check the control PCB.	Weld current is ceases. Buzzer sounds constantly. Switch machine off.
11 E94 error code displayed. Temperature sensor TH1 for IGBTs is an open circuit.	The Welding Power Source's temperature sensors have malfunctioned.	Have an Accredited Cigweld Service Provider check or replace the temperature sensors.	Weld current ceases. Buzzer sounds constantly. Switch machine off.
12 E99 error code displayed. Mains supply (input) voltage has been turned off, but control circuit has power from the primary capacitors.	A Main on/off switch on machine has been turned off. B Mains supply (input) voltage has been turned off.	A Turn on/off switch on. B Have an Accredited Cigweld Service Provider or a qualified electrician check the Main voltage and fuses.	Weld current ceases. Buzzer sounds constantly. Must switch machine off then on to reset E99 error.

SECTION 11: VOLTAGE REDUCTION DEVICE (VRD)

11.01 VRD SPECIFICATION

Description	Transtig 200 AC/DC	Notes
VRD Open Circuit Voltage	15.3 to 19.8V	Open circuit voltage between welding terminals.
VRD Resistance	148 to 193 ohms	The required resistance between welding terminals to turn ON the welding power.
VRD Turn OFF Time	0.2 to 0.3 seconds	The time taken to turn OFF the welding power once the welding current has stopped.

Table 11-1: VRD Specification

11.02 VRD MAINTENANCE

Routine inspection and testing (power source):

An inspection of the power source, an insulation resistance test and an earth resistance test should be carried out.

- For transportable equipment, at least once every 3 months.
- For fixed equipment, at least once every 12 months.

The owners of the equipment shall keep a suitable record of the periodic tests.

NOTE

A transportable power source is any equipment that is not permanently connected and fixed in the position in which it is operated.

In addition to the above tests and specifically in relation to the VRD fitted to this machine, the following periodic tests should also be conducted by an accredited Cigweld service Provider.

Description	Required Parameters
VRD Open Circuit Voltage	Less than 20V; at $V_{in}=240V$
VRD Turn ON Resistance	Less than 200 ohms
VRD Turn OFF Time	Less than 0.3 seconds

Table 11-2: Periodic Tests

If this equipment is used in a location or an environment with a high risk of electrocution then the above tests should be carried out prior to entering this location.

NOTES

SECTION 12: ADVANCED TROUBLE SHOOTING

12.00 Introduction

If you are here, all of the troubleshooting suggestions in Section 5 Basic Troubleshooting have either failed to resolve the faulty operation or have indicated that one or more of the subsystems within the power supply are defective. This section provides the information needed to take live measurements on the various subsystems within the power supply, and replace those subsystems that prove faulty.



CAUTION

Troubleshooting and repairing this unit is a process, which should be undertaken only by those familiar with high voltage/high power electronic equipment.



WARNING

There are extremely dangerous voltage and power levels present inside this unit. Do not attempt to diagnose or repair unless you have training in power electronics, measurement and troubleshooting techniques.

Under no circumstances are field repairs to be attempted on printed circuit boards or other subassemblies of this unit. Evidence of unauthorized repairs will void the factory warranty. If a subassembly is found to be defective by executing any of the procedures in this Service Manual, the subassembly should be replaced with a new one. The faulty subassembly should then be returned to Cigweld through established procedures.



WARNING

Disconnect primary power at the source before disassembling the power supply. Frequently review the "Important Safety Precautions" in section 1.02. Be sure the operator is equipped with proper gloves, clothing and eye and ear protection. Make sure no part of the operator's body comes into contact with the work piece or any internal components while the unit is activated.

12.01 System-Level Fault Isolation

If none of the suggestions provided in Section 5 have solved the problem or corrected the faulty operation, the next step is to isolate one or more of the internal subassemblies that may be defective.



CAUTION

Perform all steps in each procedure, in sequence. Skipping portions of procedures, or performing steps out of sequence can result in damage to the unit, and possible injury, or worse, to the operator.

12.1.1 Opening the Enclosure

1. Confirm that the switch on the power supply and the switch on switchboard (distribution panel) are all OFF.

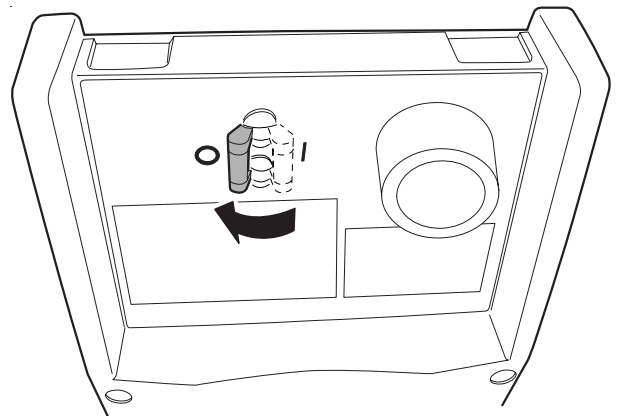


Figure 12-1: Switch OFF



CAUTION

The capacitors inside the power supply will slowly discharged after you turn off the switch of the power supply or the switch at the breaker box (distribution panel). Wait at least 5 minutes for the discharge to complete.

2) Remove all screws and nuts on the Side Panel.

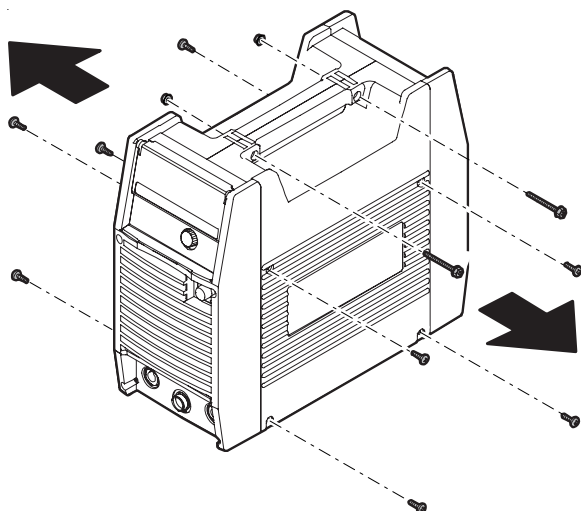


Figure 12-2: Remove screws

3) Loosen the screws on the front panel and the rear panel by turning them approximately two turns CCW.

NOTE

DO NOT remove the screws completely.

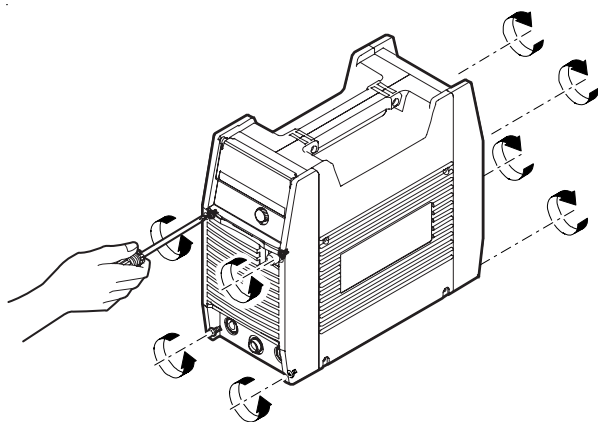


Figure 12-3: Loosen screws

4) Pull the front panel slightly forward and pull the rear panel slightly backward.

The interlocking hooks of the side case covers can now be disengaged from the front and rear panels.

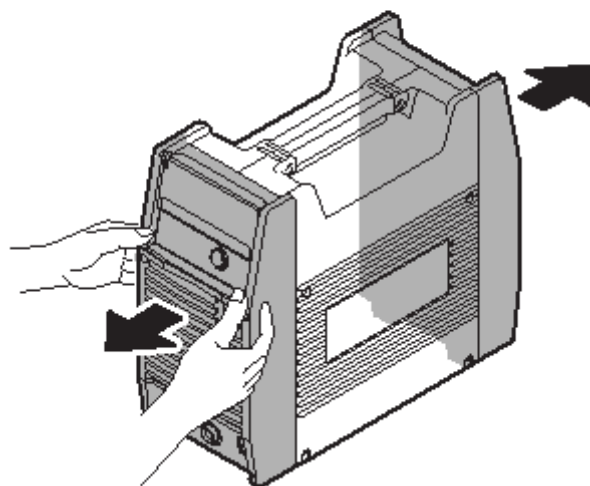
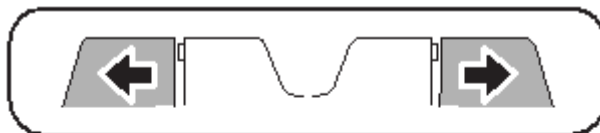


Figure 12-4: Loosen front and rear panels

5) Remove the Side Panel.

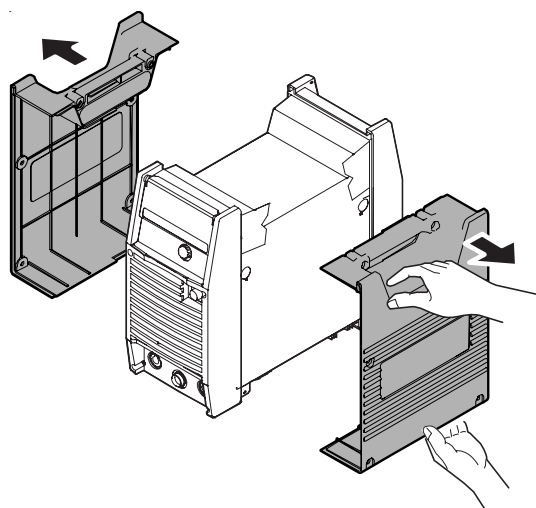


Figure 12-5: Remove side panel

- 6) Remove protection cover sheet by removing the plastic tabs.

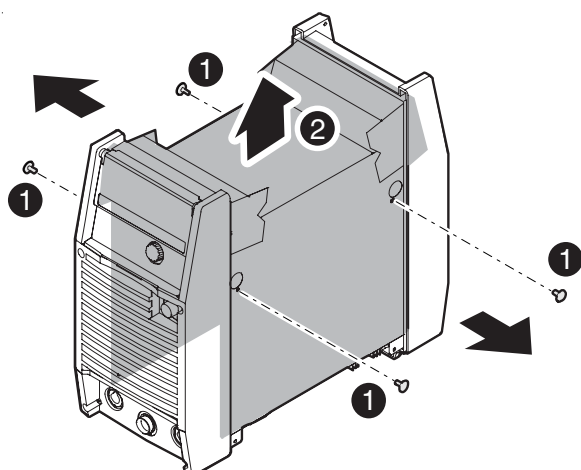


Figure 12-6: Remove PCB cover

NOTE

When you re-assemble the parts, conduct the above process backwards.

12.02 Verification and Remedy to the Indicated Error Codes

NOTE

The capacitors inside the power supply will slowly discharged after you turn off the switch of the power supply or the switch at the breaker box (distribution panel). Wait at least 5 minutes for the discharge to complete and then remove the cases to continue your inspection and repair (or maintenance) inside the power supply. For the removal and installation of the case, refer to section 12.1.1.

NOTE

During the "Verification/Remedy" procedures below, follow the alphabetical sequence (a, b, c...) and proceed with your verification and confirmation.

NOTE

After you confirm and replace all spare parts and components, confirm that there are no damaged harnesses or connectors, uninstalled or loose screws.

12.2.1 E01 "Over-Temperature at the primary side"

Cause

Occurs when an over-temperature condition of the primary IGBT is detected.

Verification/Remedy

- a. Unit may be in thermal shutdown mode.
 - Review the rated duty cycle of the unit per section 3.07. Exceeding the duty cycle can damage the unit and void the warranty. Refer to Warranty section at the end of the manual for additional information.
- b. Verify the ventilating condition.
 - Maintain a clear and unobstructed distance of more than 30cm in the front and more than 50cm in the rear of the unit for ventilation purposes.
 - Verify and maintain clean, dust free, front and rear airflow paths. Cleaning and removing dust from the front and rear panels once every six months in a normal working environment is recommended. Extremely dusty environments will require more frequent cleaning.
- c. Verify the operation of the cooling fan, FAN1, and replace it if necessary.
 - Verify the condition of FAN1. Verify that there are no broken or cracked fan blades and that FAN1 is not producing any abnormal sounds.
 - If broken or cracked FAN1 blades, or abnormal sounds are emanating from FAN1, replace FAN1.
 - Verify the operation of the cooling fan and replace it if the condition of FAN1 is inactive. Follow the instruction in section.
 - Refer to section 13.3.24 for the replacement of FAN1.
 - Refer to section 12.5.3 for additional FAN1 tests.
- d. Replace PCB6 (WK-5549).
 - Refer to section 13.3.5 for the replacement of PCB6.

12.2.2 E02 "Over-Temperature at the secondary side"

Cause

Occurs when an over-temperature condition of the secondary IGBT and diode are detected.

Verification/Remedy

- a. Unit may be in thermal shutdown mode.
 - Review the rated duty cycle of the unit per section 3.07. Exceeding the duty cycle can damage the unit and void the warranty.
- b. Verify the ventilating condition.
 - Maintain a clear and unobstructed distance of more than 30cm in the front and more than 50cm in the rear of the unit for ventilation purposes.
 - Verify and maintain clean, dust free, front and rear airflow paths. Cleaning and removing dust from the front and rear panels once every six months in a normal working environment is recommended. Extremely dusty environments will require more frequent cleaning.
- c. Verify the operation of the cooling fan, FAN1, and replace it if necessary.
 - Verify the condition of FAN1. Verify that there are no broken or cracked fan blades and that FAN1 is not producing any abnormal sounds.
 - If broken or cracked FAN1 blades or abnormal sounds are emanating from FAN1, replace FAN1.
 - Verify the operation of the cooling fan and replace it if the condition of FAN1 is inactive. Follow the instruction in section.
 - Refer to section 13.3.24 for the replacement of FAN1.
 - Refer to section 12.5.3 for additional FAN1 tests.
- d. Replace PCB6 (WK-5549).
 - Refer to section 13.35 for the replacement of PCB6.

12.2.3 E03 "Primary Over-Current Failure"

Cause

Occurs when excessive current is detected flowing into the primary side of the main transformer.

Verification/Remedy

- a. Confirm the operation of the machine within the rated specification.
 - Refer to the specification data sheet in Section 2.08.
- b. Verify the secondary diode (D2, D4 and D5).
 - Refer to section 12.5.6 for the test.
 - Refer to section 13.3.31 for the replacement.
- c. Verify the H.F. unit (HF. UNIT1).
 - Refer to section 13.3.28 for the replacement of HF.UNIT 1.
- d. Verify the secondary IGBT (Q13).
 - Refer to section 12.5.8 for the test.
 - Refer to section 13.3.32 for the replacement.
- e. Replace the Hall CT, HCT1.

NOTE

Pay special attention to the installed direction of HCT1. The Hall CT will not function properly if installed in the incorrect direction.

- Refer to section 13.3.29 for the replacement of HCT1.

12.2.4 E04 "Torch Cable Failure"

Cause

The combined length of the torch cable and the work cable is too long.

Verification/Remedy

- a. Verify the rated duty cycles of the torch/work cable and the power supply.
 - Only use appropriate sized torch cables (length and capacity). The recommended total combined length of the torch and work cable is 50 feet.
 - Torch and work cable should not be "coiled" during welding operations.
 - Maintain the duty cycle of the power supply.

Refer to 2.9 for the recommended duty cycle.

- b. Replace PCB6 (WK-5549) and PCB13 (WK-5569).
 - Refer to section 13.3.5 for the replacement of PCB6.
 - Refer to section 13.3.12 for the replacement of PCB13.

12.2.5 E11 "Main Supply Over Voltage"

Cause

Main supply voltage occurs at about 275V or more.

Verification/Remedy

- a. Verify main supply voltage.
 - Perform what is described in a section of "Verification of the Power Supply Voltage". Refer to section 12.5.2.
- b. Replace PCB4 (WK-4819).
 - Verify PCB4 (WK-4819) and replace it if necessary. Refer to section 13.3.4.

12.2.6 E12 "Main Supply Under Voltage"

Cause

Main supply voltage occurs in about 150V or less.

Verification/Remedy

- a. Verify main supply voltage.
 - Perform what is described in a section of "Verification of the Power Supply Voltage". Refer to section 12.5.2.
- b. Replace PCB4 (WK-4819).
 - Verify PCB4 (WK-4819) and replace it if necessary. Refer to section 13.3.4.

12.2.7 E81 "Abnormal Input Voltage"

Cause

The detection circuitry of main supply voltage is abnormal.

Verification/Remedy

- a. Verify main supply voltage.
 - Perform what is described in the section "Verification of the Power Supply Voltage". Refer to section 12.5.2.
- b. Confirm a secure connection of the harness wired between CN2 on PCB3 (WK-5548) and CN1 on PCB17 (WK-4917).

- Re-install the harness with a secure connection.
 - Contact the manufacturer if you find any broken connectors or a damaged wiring harness.
- c. Verify PCB4 (WK-4819) and replace it if necessary.

- Check whether there are any abnormalities on the appearance of PCB4.
- Replace PCB4. Refer to section 13.3.4.

12.2.8 E82 "Rated Voltage Selection Circuit abnormality"

Cause

Rated voltage selection circuit inside the Welding Power Source is not functioning properly.

Verification/Remedy

- a. Verify the wiring harness and connection of CN4 on PCB4 (WK-4819).
 - Re-install the harness with a secure connection.
 - Contact the manufacturer if you find any broken connectors or damaged wiring harness.
- b. Verify PCB4 (WK-4819) and replace it if necessary.
 - Check whether there are any abnormalities on the appearance of PCB4.
 - Replace PCB4. Refer to section 13.3.4.

12.2.9 E83 "Abnormalities in Mains Supply Voltage Detection"

Cause

Abnormalities, such as an input voltage detection circuit

Verification/Remedy

- a. Verify main supply voltage.
 - Perform what is described in a section of "Verification of the Power Supply Voltage". Refer to section 12.5.2.
- b. Confirm a secure connection of the harness wired between CN2 on PCB3 (WK-5548) and CN1 on PCB17 (WK-4917).
 - Re-install the harness with a secure connection.
 - Contact the manufacturer if you find any broken connectors or damaged wiring harness.
- c. Verify PCB4 (WK-4819) and replace it if necessary.
 - Check whether there are any abnormalities on the appearance of PCB4.
 - Replace PCB4. Refer to section 13.3.4.

12.2.10 E85 "Pre-charge abnormality"
Cause

Due to malfunction inside the Welding Power Source, primary capacitors are not charging correctly.

Verification/Remedy

- a. Verify the connection PCB2 (WK-5482) and the rectified output voltage of the rectifier.
 - Verify the connection between CN2 on PCB2 and CN3 on PCB3.
 - Confirm whether there is any breakage (blown, burnt, cracked, etc.) of R4 and R5.
 - Perform what is described in a section of "Verification of the Power Supply Voltage". Refer to section 12.5.2.
- b. Verify the primary diode (D1).
 - Verify D1. Refer to section 12.5.2.3.
 - Replace D1. Refer to section 13.3.30.
- c. Verify the primary IGBT (Q1-Q12).
 - Verify IGBT. Refer to section 12.5.2.5.
 - Replace IGBT. Refer to section 13.3.7, 13.3.8.
- d. Replace PCB2 (WK-5482) and PCB4 (WK-4819).
 - Replace PCB2 and PCB4, when abnormalities occur, even if you carry out the above-mentioned verifications. Refer to section 13.3.2, 13.3.4.

12.2.11 E94 "Thermistor malfunction"
Cause

Thermistors for detecting temperature of internal components have malfunctioned.

Verification/Remedy

- a. Confirm a secure connection of the harness wired between CN8-9 on PCB6 (WK-5549) and Thermistors (TH1, TH2).
 - Re-install the harness with a secure connection.
 - Contact the manufacturer if you find any broken connectors or a damaged wiring harness.
- b. Replace thermistors (TH1, TH2).
 - Refer to section 13.3.22, 13.3.23.
- c. Replace PCB6 (WK-5549).
 - Refer to section 13.3.5.

12.2.12 E99 "Initial Power Receiving"
Cause

Occurs when the initial AC power received signal has not reached the CPU. This error occurs normally during the power "OFF" sequence of the unit.

Verification/Remedy

- a. Confirm a secure connection of the harness wired between CN1 on PCB17 (WK-4917) and CN2 on PCB3 (WK-5548).
 - Re-install the harness with a secure connection.
 - Contact the manufacturer if you find any broken connectors or a damaged wiring harness.
- b. Verify PCB4 (WK-4819) and replace it if necessary.
 - Confirm a secure connection of all harnesses wired to PCB3 and PCB4.
 - Replace PCB4. Refer to section 13.3.4.
- c. Replace PCB6 (WK-5549).
 - Refer to section 13.3.5.

12.03 Verification and Remedy to Failures without Indication Codes

Refer to Note on Section 12.02.

12.3.1 "Cooling Fan (FAN1) Failure" (Fan is not rotating.)
Cause

Occurs when the cooling fan (FAN1) is defective, damaged or the driving voltage is incorrect.

Verification/Remedy

- a. Verify the cooling fan (FAN1).
 - Inspect the condition of the fan blades and all peripheral parts. Clean the fan blades and all peripheral parts if covered with dust. Cleaning and removing dust from the fan blades once every 6 months in a normal environment is recommended. Extremely dusty environments will require more frequent cleaning.
 - Verify that there are no wiring harnesses entangled inside the fan, confirm that the harnesses do not have any brakes in the wire or damaged connectors.
 - Replace wiring harnesses if you find any broken connectors or damaged wiring harnesses.

- Replace the fan if there are any broken, cracked or missing fan blades.
- Refer to section 13.3.24.
- b. Verify the wiring harness between the cooling fan (FAN1) and CN11 on PCB3 (WK-5548).
 - Confirm a secure connection of the harness to CN11 on PCB3.
- c. Verify the drive circuitry of the cooling fan (FAN1) on PCB3.
 - Verify the drive circuitry of the cooling fan (FAN1) on PCB3.
 - Refer to section 12.5.3.
 - Replace PCB3 if necessary.
 - Refer to section 13.3.4.

12.3.2 "Gas Valve Failure" (No Gas flow through unit)

Cause

Occurs when the gas valve (SOL1) is defective, damaged or the driving voltage is incorrect.

Verification/Remedy

- a. Confirm that TIG welding is selected on the welding mode.
 - Do not change welding modes while welding. Only change welding modes when the unit is idle (torch switch OFF).
 - Verify the setting of Pre-flow and Post-flow on the front panel. If the Pre-flow or Post-flow time is set to 0 seconds, change them to higher setting.
- b. Verify the layout the of the gas hose.
 - Confirm that the hose is securely connected into the fitting at the inlet and the outlet. Confirm that the layout of the gas hose so that it is not bent or kinked. Confirm there are no breaks, burns or holes in the hose.
 - Confirm the layout of the TIG torch gas hose and that the hose adapters are properly connected.
- c. Verify the wiring harness and connection of gas valve (SOL1) and CN11 on PCB3 (WK-5548).
- d. Verify the drive circuitry of the gas valve (SOL1).
 - Verify the drive circuitry of the gas valve (SOL1).
 - Refer to section 12.5.4.
 - Replace PCB3, when abnormal.
 - Refer to section 13.3.3.

- e. Replace the PCB6 (WK-5549).

- Refer to section 13.3.5.

12.3.3 "No Weld Output"

When in High Frequency TIG (HF TIG) mode, if the High Frequency is not generated (present), refer to "High Frequency Output Failure". Refer to section 12.3.5..

Cause

Occurs when the remote connector (CON1) or associated circuitry is defective, damaged, or the TIG torch cable is defective.

Verification/Remedy



CAUTION

Read and understand this entire section before proceeding. Extreme personal harm and test equipment damage will occur if the procedures are not performed accurately.

- a. Verify the remote connector (CON1). (Applies to LIFT TIG and High Frequency TIG (HF TIG) mode.)
 - Confirm a secure between the remote connector (CON1) and the TIG torch cable.
 - Confirm a secure connection of the harness and the connections between the remote connector (CON1) and PCB7 (WK-5550) are all correct and there are no open circuits.
 - Contact the manufacture if you find any broken connectors or damaged wiring harnesses.
 - Confirm the proper pins-outs of the remote connector at the TIG Torch side. (Refer to section in the Operating Manual.)
 - Confirm that there is no open circuit on the remote connector at TIG Torch side.
 - In equipment for remote control use, confirm the pin specification of a connector. (Refer to section Operating Manual.)
- b. Verify the condition and connections of the welding cable, the stick rod holders and the ground clamp. (Applies to all welding modes.)
 - Confirm a secure connection of the welding cable, stick rod holders, ground clamp and dinse connectors and there are no open circuits.
- c. Verify the no-load voltage (OCV). (Applies to STICK, High Frequency TIG (HF TIG) mode.)
 - Refer to the section 12.5.9 "Verification of No-load voltage (OCV)".

- If performing the "No-Load Voltage Failure" procedure does not rectify the failure, perform the following tests in the sequence below. Replace any defective components found.

1. Secondary IGBT (Q13)
 - Verification. Refer to section 12.5.7.
 - Replacement. Refer to section 13.3.32.
2. Secondary diode (D2, D4, D5)
 - Verification. Refer to section 12.5.6.
 - Replacement. Refer to section 13.3.31.
3. Coupling coil (CC1)
 - Replacement. Refer to section 13.3.20.
4. Reactor (FCH1)
 - Replacement. Refer to section 13.3.21.
5. Transformer (T1)
 - Replacement. Refer to section 13.3.11.
6. Primary IGBT (Q1-Q12)
 - Verification. Refer to section 12.5.7.
 - Replacement. Refer to section 13.3.7, 13.3.8.
7. Hall C.T. (HCT1)
 - Replacement. Refer to section 13.3.29.

12.3.4 "Operating Panel Failure" (LED's do not light properly or welding setting cannot be established.)

Cause

Occurs when there is a connection failure among PCB6 (WK-5549), PCB10 (WK-5527) and PCB6 or PCB10 are defective.

Verification/Remedy

- a. Verify the harness connection between CN21 on PCB6 (WK-5549) and CN2 on PCB10 (WK- 5527).
 - Confirm a secure connection of the harness and the connections between CN21 on PCB6 (WK-5549) and CN2 on PCB10 (WK-5527).
 - Contact the manufacturer if you find any broken connectors or damaged wiring harnesses.
- b. Verify the connection between PCB5 (WK- 5551) and PCB6 (WK-5549).
- c. Replace PCB5 (WK-5551) and PCB6 (WK- 5549).
 - Refer to section 13.3.4, 13.3.6.
- d) Replace PCB6 (WK-5549) and PCB10 (WK-5527).
 - Refer to section 13.3.6, 13.3.10.

12.3.5 "High Frequency Output Failure" (Unit does not generate High Frequency.)

Cause

Occurs when the HF unit (HF UNIT1) is defective or blown.

Verification/Remedy



CAUTION

Read and understand this entire section before proceeding. Extreme personal harm and test equipment damage will occur if the procedures are not performed accurately. The unit will generate a High Voltage component that can cause extreme personal harm and test equipment damage. Capacitors installed inside the Welding Power Source are electrically charged for a while after the Mains ON/ OFF switch or distribution panel switch has been turned off. Before inspecting the inside of the Welding Power Source, leave it for about 5 min. after switching off power for discharging the capacitors, and then remove the top and side panels.

- a. Verify the connection between High Frequency Unit (HF UNIT1) and Coupling Coil (CC1).
 - Verify the connection between the HF UNIT1 and CC1; confirm that the quick-disconnect terminals are inserted onto the terminals of HF UNIT1 (TB5- TB6) correctly and completely.
 - Confirm there are no short circuits, burnt or broken wires at CC1.
 - Replace CC1.
 - Refer to section 13.3.20.
- b. Verify the connection between High Frequency (HF UNIT1) and the current limiting resistor (R2).
 - Verify the connection between HF UNIT1 and the current limiting resistor (R2), confirm that the quick-disconnect terminals are inserted onto the terminals of HF UNIT1 (TB3- TB4) correctly and completely.
 - Confirm there are no short circuits, burnt or broken wires between the HF UNIT1 and the current limiting resistor (R2).
- c. Verify the connection between the terminals between AC1-AC2 (TB1-TB2).

- Verify the connection between AC1-AC2, confirm that the quick-disconnect terminals are inserted onto the terminals of HF UNIT1 correctly and completely.
 - Confirm there are no short circuits, burnt or broken wires between AC1 and AC2.
- d. Verify and replace the Gap (GAP) of the High Frequency Unit (HF UNIT1).
- Confirm that the GAP is connected to HF UNIT1 correctly and completely.
 - Confirm there is no dust or foreign debris between the space of the GAP.
 - If there are any abnormalities observed with the GAP, replace the GAP.
 - A setup of a gap is 1.0mm. In the case of a gap 1.0mm or more, high frequency voltage and a period increase. In the case of a gap 1.0mm or less, high frequency voltage and a period decrease.
- e. Verify and replace the Current limiting Resistor (R6) on HF UNIT1.
- If R6 is defective (blown, burnt, cracked, etc.), replace R6.
 - Refer to section 13.3.19.
- f. Replace the High Frequency Unit (HF UNIT1).
- Refer to section 13.3.28.
- g. Replace PCB3 (WK-5548).
- Refer to section 13.3.4.

12.04 Fault Isolation Tests

12.4.1 Preparation

The following initial conditions must be met prior to starting any of the procedures in this section.

1. Connect the appropriate input voltage. (Check the name plate on the rear of the power supply for the proper input voltage.)

NOTE

Operate at all input voltages as noted on the nameplate on the rear panel when testing the power supply.

2. Remove the Side Panel. Refer to the section 12.1.1.
3. Close primary power source wall disconnect switch or circuit breaker.
4. Place power supply MAIN CIRCUIT SWITCH (S1) on rear of the unit in the ON position.



WARNING

Dangerous voltage and power levels are present inside this unit. Be sure the operator is equipped with proper gloves, clothing and eye and ear protection. Make sure no part of the operator's body comes into contact with the work piece or any internal components while the unit is activated.

12.05 Verification of the Power Input Circuitry



CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 12. 4.1 "Preparation".

12.5.1 Verification of the AC Input Voltage using an AC Voltmeter

1. Verify input voltage (Phase-to-Phase) using an AC voltmeter. (The capability of the voltmeter should be more than 600VAC). Measure the point between lines U1 and V1 on the input switch, S1. Measure the point between lines U1 and W1 on the input switch, S1. Measure the point between lines V1 and W1 on the input switch, S1. The location of points U1, V1 and W1 on switch S1 are indicated in Figure 6-7. When using a single-phase connection, the voltage can be verified only between U1 and V1.

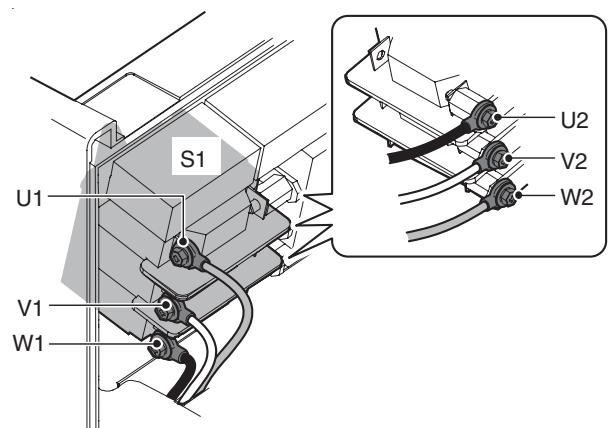


Figure 6-7: Check points U1, U2, V1, V2, W1 and W2

2. If the input voltage is out of the operating range of the unit, which is 10% (187 ~ 253 / 414 ~ 506 VAC) of the rated voltage (208, 230 / 460V), verify the available power capacity at the installed site. If the input voltage is within the operating range, recheck the input voltage while welding, as welding may cause the input voltage to decrease to a value below the operating range of the unit.
3. Verify input voltage after the input switch (S1) using an AC voltmeter. (The capability of the voltmeter should be more than 600VAC.)
 - Using an AC voltmeter, measure between the points U2 and V2 on the input switch, S1.
 - Using an AC voltmeter, measure between the points U2 and W2 on the input switch, S1.
 - Using an AC voltmeter, measure between the points V2 and W2 on the input switch, S1.

The location of points U2, V2 and W2 on switch S1 are indicated in Figure 6-7. When using a single-phase connection, the voltage can be verified only between U2 and V2.

4. If this voltage is out of the operating range, which is 10% (187~253/414~ 506VAC) of the rated voltage (208, 230 / 460V), replace S1 following the process in section 13.3.26.
5. Verify the rectified output voltage of the input diode, D1 using a DC voltmeter. (The capability of the voltmeter should be more than 1000VDC.) Using a DC voltmeter, measure between the points 1 (P) [+] and 2 (N) [-] on D1. Points 1 (P) and 2 (N) are on D1. See Figure 12.8. The measured voltage should be approximately 1.4 times larger than input voltage measured in #1 above. Replace diode D1 if the calculated measurement is not within the corresponding range (260 ~ 360 / 580 ~ 720 VDC) following the process in section 13.3.30.

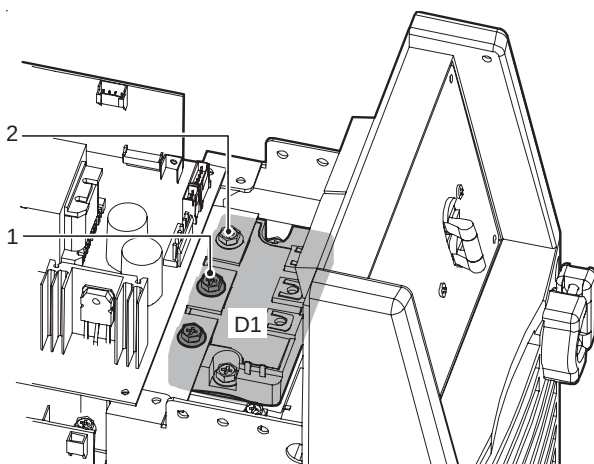


Figure 6-8: The check points 1 (P) and 2 (N)

6. Verify bus voltage (the voltage of the electrolytic capacitor after rectification) using a DC voltmeter. (The capability of the voltmeter should be more than 1000VDC.) Using a DC voltmeter, measure between the points TB1 (P) [+] and TB2 (N) [-] on PCB1 (WK-5477) Points TB1 (P) and TB2 (N) can be found on the parts side of PCB1. See Figure 6-9. The measured voltage should be approximately 1.4 times larger than input voltage measured in #1 above. Replace diode D1 if the calculated measurement is not within the corresponding range (260 ~ 360 / 580 ~ 720 VDC).

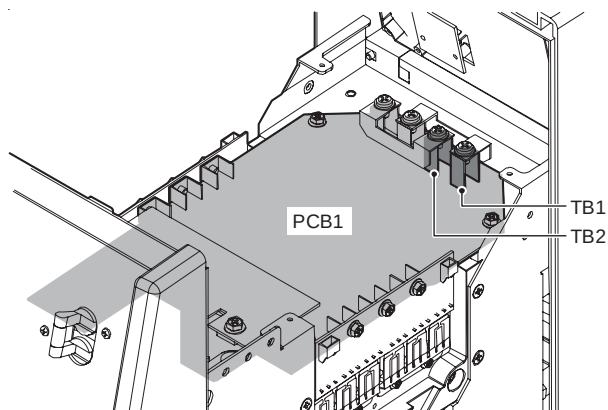


Figure 6-9: The check points TB1(P) and TB2(N)

7. After the replacement of D1, if the above voltage is still abnormal, replace PCB1 (WK-5477).

12.5.2 Verification of Power Supply Voltage



CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 12. 4.1 "Preparation".

1. Verify Power Supply voltage using an DC voltmeter. (The capability of the voltmeter should be more than 50VDC.) Operate at all input voltages as noted on the nameplate on the rear panel when testing the power supply.
2. On the PCB3 (WK-5548) and PCB6 (WK- 5549), measure the voltages according to the following table. The check points and the reference are obtainable on the top side of PCB6 (WK-5549). The locations of points are indicated in Figure 6-10, 6-11.

12.5.3 Verification of the Cooling Fan, FAN1, Drive Circuitry



CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 12. 4.1 "Preparation".

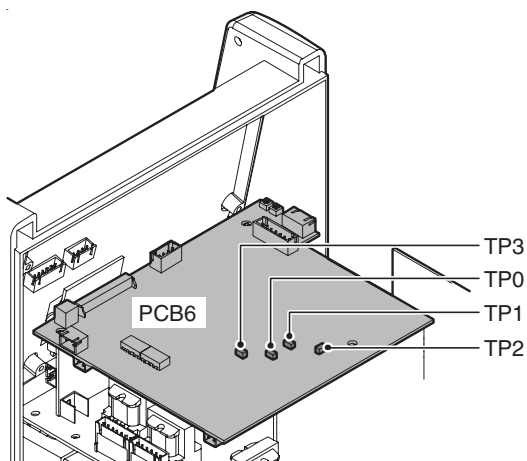


Figure 6-10: Checkpoints TP0-TP3 on PCB6

Check Point PCB3	Reference PCB3	ACCEPTABLE VALUE
Pin 1 on CN18	Pin 3 on CN18	+24VDC

Table 6-1: Checkpoints TP0-TP3 on PCB6

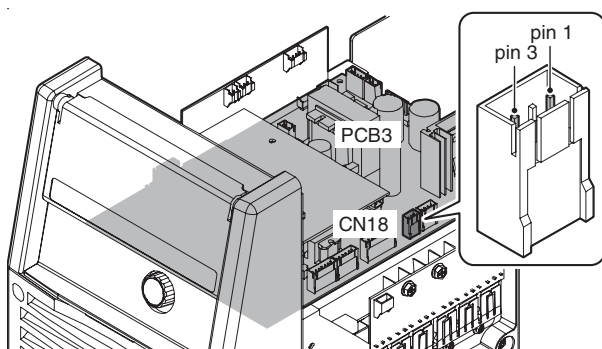


Figure 6-11: Checkpoints CN18 on PCB3

- If any of these voltages are not present or are below a 10% tolerance, replace PCB3 (WK-5548). Refer to section 13.3.4.

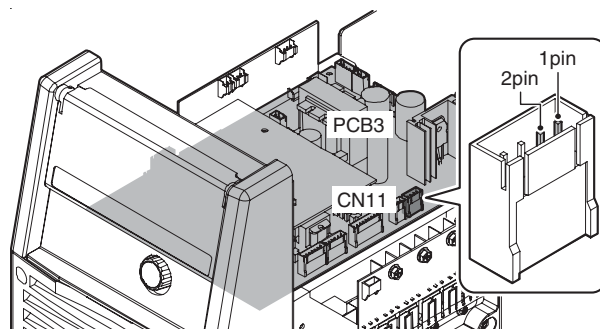


Figure 6-12: Verification of the FAN1

- Using the measurement taken above, follow the chart below for possible failure modes.

	FAN1 Status	Voltage measurement. (1PIN-2PIN of CN11 on PCB3)	Remedy
Case 1	Rotating	DC 18 ~ 25V	FAN1 drive circuit is normal.
Case 2	Rotating	Below DC 18V	Replace PCB3. Refer to section 12.3.4.
Case 3	Inactive	Below DC 18V	Replace PCB3. Refer to section 12.3.4.4. Perform "2". Verification of Power Supply Voltage" Refer to section 11.5.2.
Case 4	Inactive	DC 18 ~ 25V	Replace the FAN1. Refer to section 12.3.24.

Table 6-3: Verification of the FAN1

- During low output and standby, fan rotation becomes slower. Therefore, exact voltage measurement becomes impossible.
- When verifying the voltage, confirm that the AC input voltage remains within the operating range of the unit (the AC input does not drop below 180VAC).

12.5.4 Verification of the Gas Valve, SOL1, Drive Circuitry



CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 12. 4.1 "Preparation".

1. Verify the voltage between the PIN 3 (Positive [+]) and PIN 4 (Negative [-]) of connector CN11 on PCB3 (WK-5548) while you press the torch switch while in TIG Mode. (The capacity of the voltmeter should be more than 50VDC.) The location of connector CN11 of PCB3 (WK- 5548) is indicated in Figure 6-13. When you measure the above voltage, do not remove the connector. Conduct the measurement while the connector plug and receptacle are still connected.

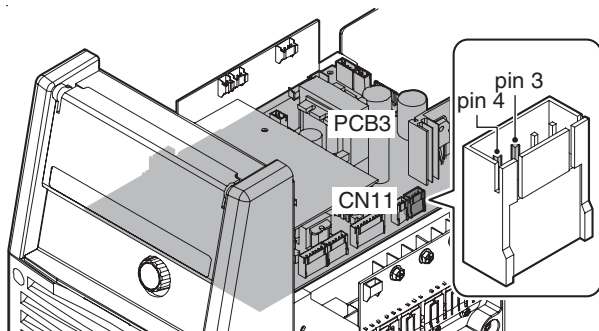


Figure 6-13: Verification of the SOL1

2. Using the measurement taken above, follow the chart below for possible failure modes.

	Voltage measurement. (1PIN-2PIN of CN11 on PCB3)	Remedy
Case 1	Below DC 18V	Replace PCB1. Refer to section 12.3.1.
Case 2	DC 18 ~ 25V	Replace SOL1. Refer to section 12.3.25.

Table 6-4: Verification of the SOL1

3. When verifying the voltage, confirm that the AC input voltage remain within the operating range of the unit. (The AC input does not drop below 180VAC).

12.5.5 Verification of the primary Diode (D1)



CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 12. 4.1 "Preparation".

1. Verify the characteristic of the primary diode, D1, using a diode tester.
2. Refer to Table 6-5 and Figure 6-14 for the checkpoints on D1.

COMPONENT TESTED	TERMINALS		ACCEPTABLE VALUE
	Positive lead	Negative lead	
Diode of D1	3, 4, 5	0	0.3 to 0.5V
	0	3, 4, 5	Open
	3, 4, 5	2	Open
	2	3, 4, 5	0.3 to 0.5V
Thyristor of D1	0	1	Open
	1	0	Open

Table 6-5: Tester checkpoints for D1

12.5.6 Verification of the secondary Diode (D2, D4, D5)



Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 12. 4.1 "Preparation".

- 1. Verify the characteristic of the secondary diode, D2, D4 and D5, using a diode tester.
- 2. Refer to Table 6-6 and Figure 6-15 for the checkpoints on D2, D4 and D5.

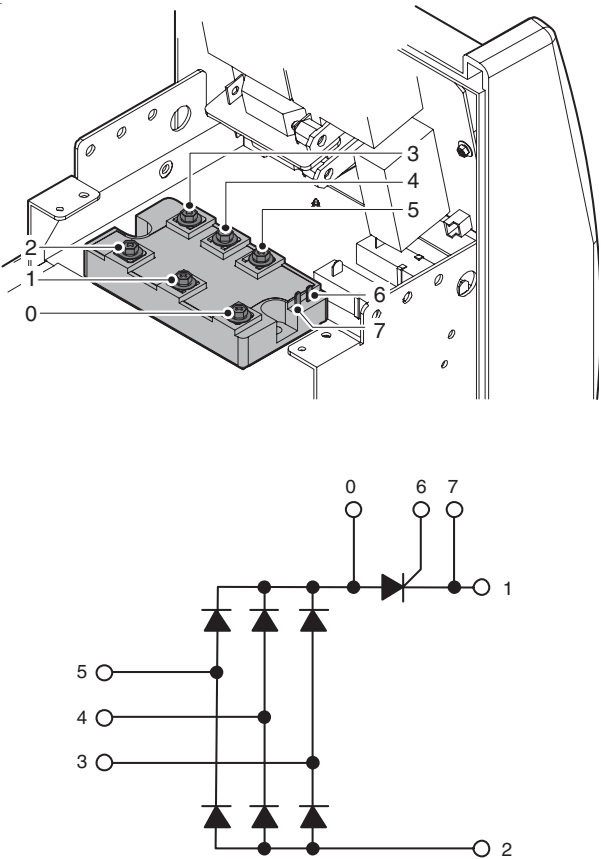


Figure 6-14: Tester checkpoints for D1 and showing the connection diagram

COMPONENT TESTED	TERMINALS		ACCEPTABLE VALUE
	Positive lead	Negative lead	
Diode 1 of D2, D4 and D5	Anode Cathode	Cathode Anode	0.2 to 0.3V Open
Diode 2 of D2, D4 and D5	Anode Cathode	Cathode Anode	0.2 to 0.3V Open

Table 6-6: Tester checkpoints for D2, D4 and D5

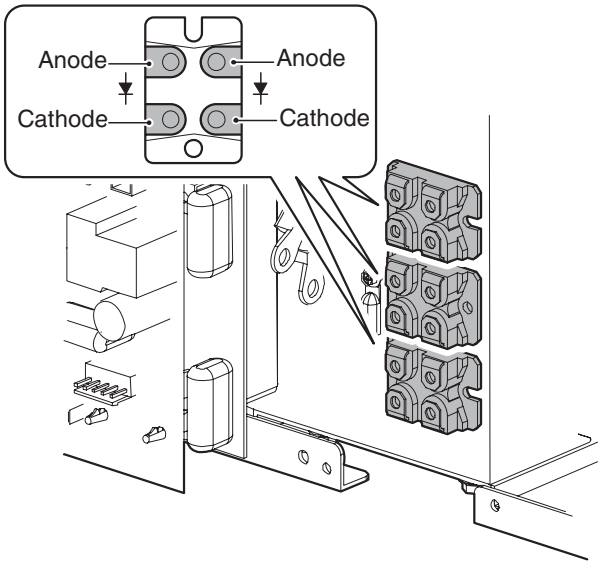


Figure 6-15: Tester checkpoints in D2, D4 and D5

12.5.7 Verification of the primary IGBT (Q1-Q12)



Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 12. 4.1 "Preparation".

1. Check whether there are any abnormalities in the appearance of PCB8 and PCB9.
2. Verify the characteristic of the primary IGBT (Q1-Q12), using a diode tester.
3. Refer to Table 6-7 and Figure 6-16 for the checkpoints on PCB8 and PCB9.

COMPONENT TESTED	TERMINALS		ACCEPTABLE VALUE
	Positive lead	Negative lead	
Collector-Emitter of Q13 (by PCB15 connector)	C 1	C2E1	Open
	C2E1	C1	0.2 to 0.5V
	C2E1	E2	Open
	E2	C2E1	0.2 to 0.5V

Table 6-7: Tester checkpoints for Q1-Q12

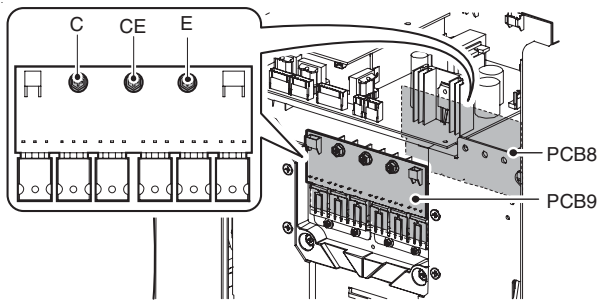


Figure 6-16: Tester checkpoints in the Q1-Q12

12.5.8 Verification of the secondary IGBT (Q13)



Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 12. 4.1 "Preparation".

1. Check whether there are any abnormalities on the appearance of PCB14.
2. Verify the characteristic of the secondary IGBT (Q13), using a diode tester.
3. Refer to Table 6-8 and Figure 6-17 for the checkpoints on Q13.

COMPONENT TESTED	TERMINALS		ACCEPTABLE VALUE
	Positive lead	Negative lead	
Collector-Emitter of Q13 (by PCB15 connector)	C 1	C2E1	Open
	C2E1	C1	0.2 to 0.5V
	C2E1	E2	Open
	E2	C2E1	0.2 to 0.5V

Table 6-8: Tester checkpoints for Q13

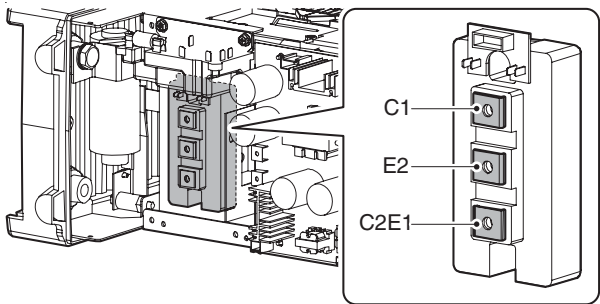


Figure 6-17: Tester checkpoints in the Q13

12.5.9 Verification of No-load Voltage (OCV)



CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 12. 4.1 "Preparation".

1. Verify the no-load voltage in STICK mode.
 - a. In STICK welding mode, mark and then turn potentiometer VR1 on PCB6 (WK-5549) all the way to the right and turn off the electric shock protector function (Voltage-Reduction-Device, VRD).
 - b. Contactor function is put into the state of "ON" pushing Function button. Refer to section 12.



WARNING

Electric shock hazard. The unit will generate OCV immediately when contactor function is put into the state of "ON" pushing Function button enabling STICK mode.

- c. Verify the no-load voltage using a DC voltmeter. (The capability of the voltmeter should be more than 100VDC.)
 - d. The normal no-load voltage is approximately 65V.
2. Verify the no-load voltage (OCV) in High Frequency TIG mode.



WARNING

This welding mode produces high frequency and high voltage. Extra care shall be taken to prevent electric shock.

3. When in HF TIG mode, the unit will generate high voltage. To prevent personal harm and test equipment damage, mark and then remove the indicated wire from the HF UNIT1 shown in Figure 6-18. To prevent electric shock, always wrap the removed wire with electrical tape or other suitable insulation.

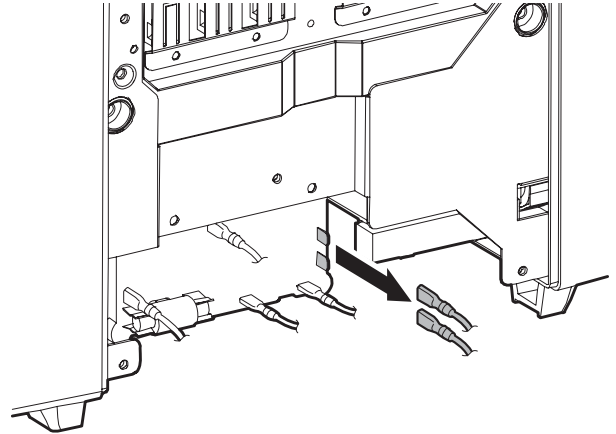


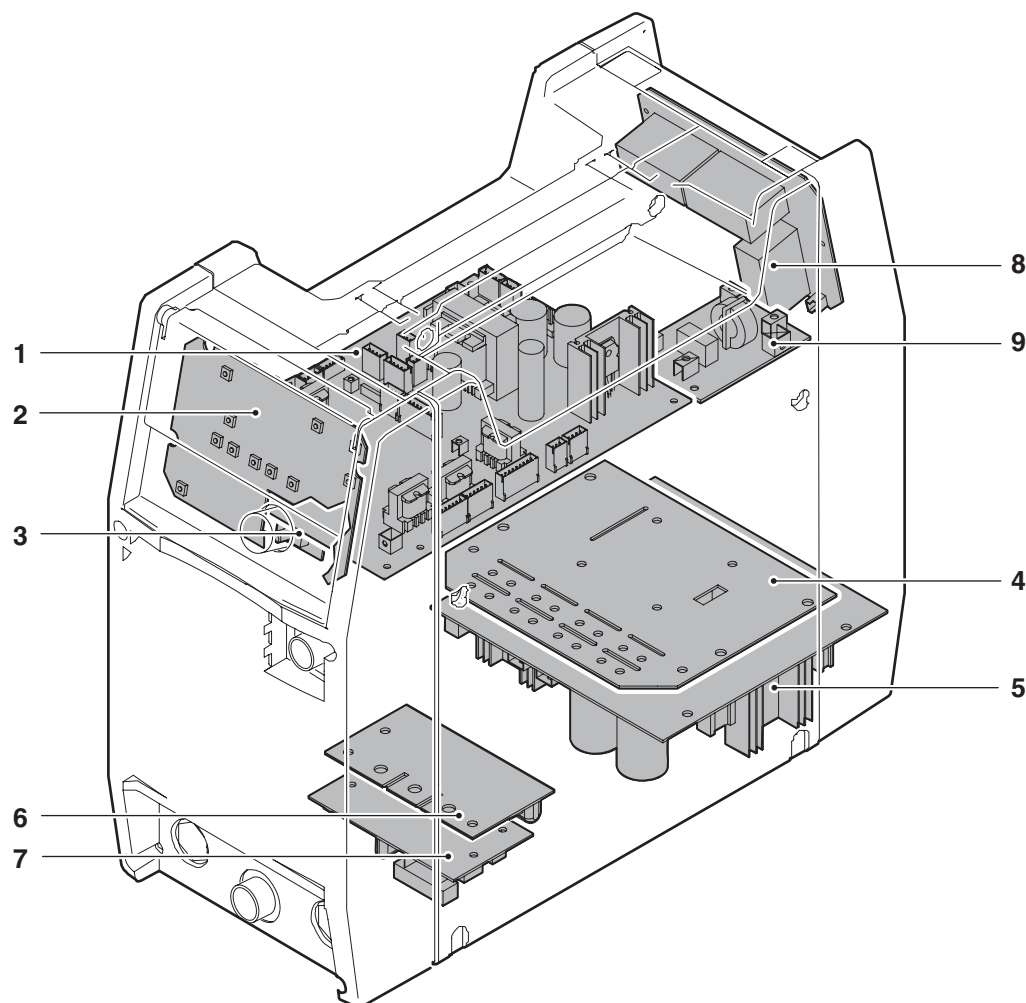
Figure 6-18: Removal and installation from the HF UNIT1 (To disable the operation of the HF unit.)

4. Press the Welding mode selection button to select HF TIG welding mode.
5. While depressing the Torch switch, verify the OCV using a DC voltmeter. (The capability of the voltmeter should be more than 100VDC.) The check point with a tester is the voltage between output terminal + and -. In TIG mode, the OCV ceases 3 seconds after you depress the torch switch.
6. The normal no-load voltage is approximately 58-62V.
7. Return the setting variable resistor (VR1) to the original position. (Return to the position recorded by "a. 1)" clause.)
 - Fully clockwise: VRD ON
 - Fully counterclockwise: VRD OFF
8. Return connection with HF UNIT1 to the original position.

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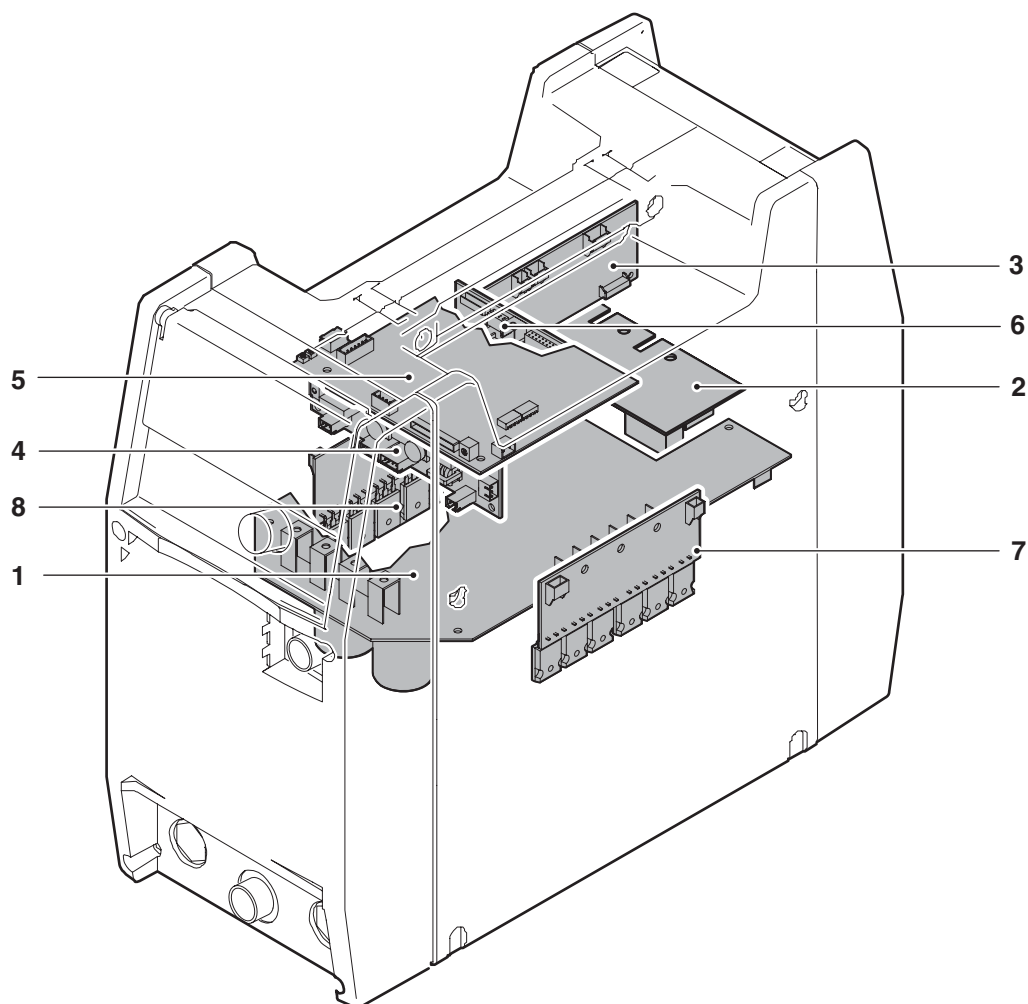
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1 Maintenance List



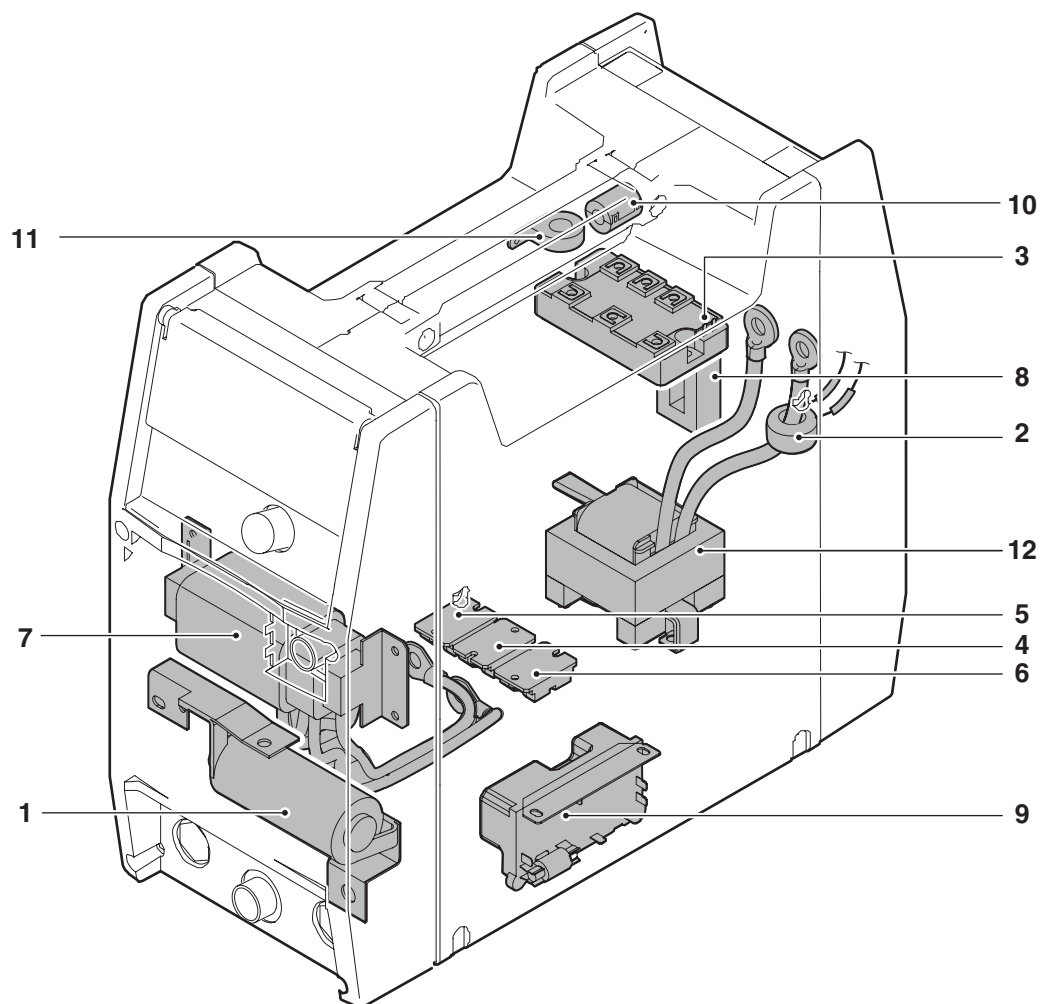
No.	DWG No.	Parts name	Reference page	Part No.
1	PCB3	Print Circuit Board (WK-5548)	13-9	W7001314
2	PCB10	Print Circuit Board (WK-5527)	13-13	W7001812
3	PCB11	Print Circuit Board (WK-5528)	13-13	W7001320
4	PCB12	Print Circuit Board (WK-5615)	13-15	W7001594
5	PCB13	Print Circuit Board (WK-5569)	13-18	W7001433
6	PCB14	Print Circuit Board (WK-5570)	13-19	W7001434
7	PCB16	Print Circuit Board (WK-5499)	13-19	W7001324
8	PCB17	Print Circuit Board (WK-4917)	13-20	10-6740
9	PCB18	Print Circuit Board (WK-5861)	13-21	W7001602

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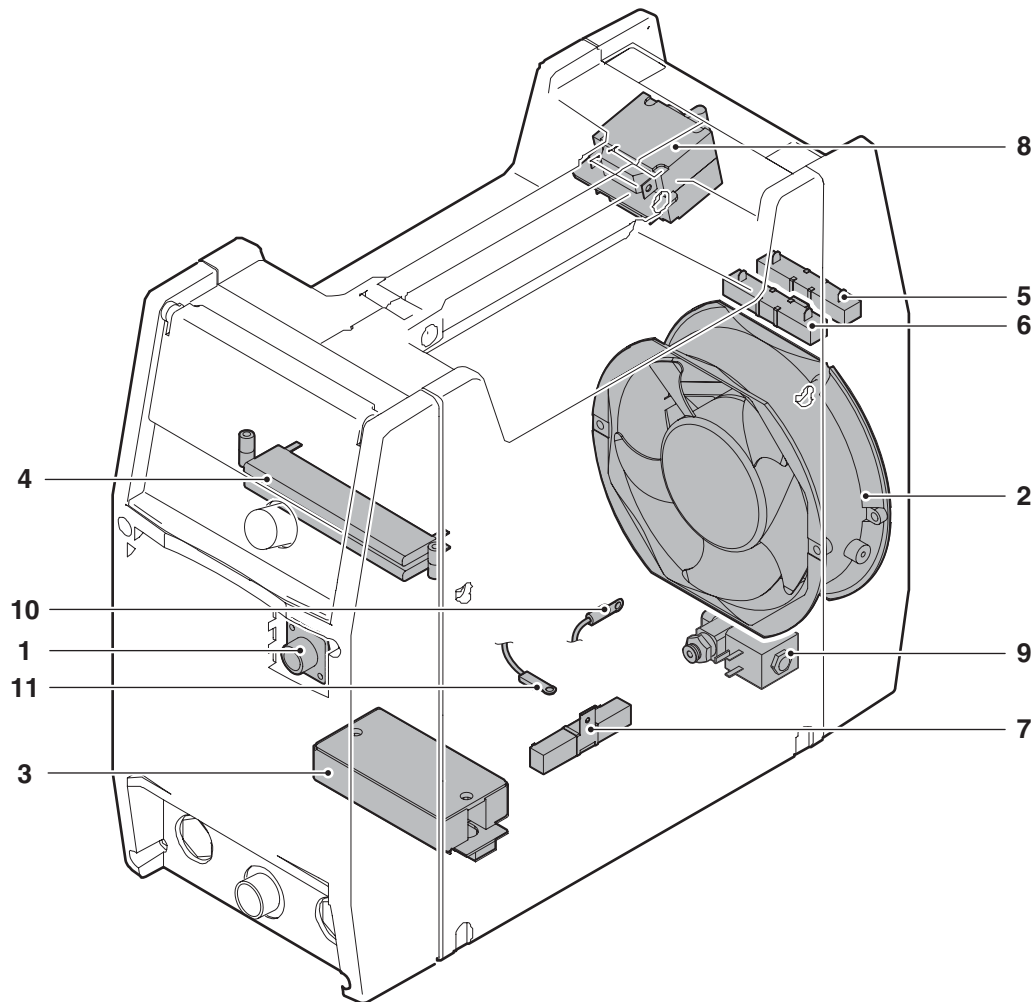
No.	DWG No.	Parts name	Reference page	Part No.
1	PCB1	Print Circuit Board (WK-5477)	13-6	W7001402
2	PCB2	Print Circuit Board (WK-5596)	13-7	W7001601
3	PCB4	Print Circuit Board (WK-4819)	13-10	10-6635
4	PCB5	Print Circuit Board (WK-5551)	13-10	W7001417
5	PCB6	Print Circuit Board (WK-5549)	13-10	W7001727
6	PCB7	Print Circuit Board (WK-5550)	13-11	W7001423
7	PCB8 (Q1~Q6)	Print Circuit Board (WK-5479) (Primary IGBT)	13-11	W7001318
8	PCB9 (Q7~Q12)	Print Circuit Board (WK-5479) (Primary IGBT)	13-12	W7001318

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No.	DWG No.	Parts name	Reference page	Part No.
1	CC1	Coupling Coil	13-24	W7001384
2	CT2	Current Trans	13-15	W7001304
3	D1	Primary Diode	13-32	10-6628
4	D2	Secondary Diode	13-33	10-6629
5	D4	Secondary Diode	13-33	10-6629
6	D5	Secondary Diode	13-33	10-6629
7	FCH1	Reactor	13-31	W7001502
8	HCT1	Hall C. T.	13-25	10-5003
9	HF. UNIT	High Frequency Unit	13-31	W7001399
10	L101	Reactor	13-35	W7001400
11	L103	Earth Inductance	13-35	W7001605
12	T1	Main Trans	13-15	W7001456

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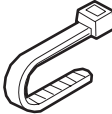
No.	DWG No.	Parts name	Reference page	Part No.
1	CON1	Remote Connector	13-29	W7001595
2	FAN1	Cooling Fan	13-27	W7001307
3	Q13 (PCB15)	Secondary IGBT (WK-3367)	13-34	10-6643
4	R3	Discharge Resistor	13-22	10-5137
5	R4	Current Limiting Resistor	13-23	W7001452
6	R5	Current Limiting Resistor	13-23	W7001452
7	R6	Resistor on High Frequency Unit	13-24	W7001451
8	S1	Main ON/OFF Switch	13-29	W7001453
9	SOL1	Solenoid Valve	13-28	W7001604
10	TH1	Primary Thermistor	13-26	10-5228
11	TH2	Secondary Thermistor	13-26	10-5228

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2 Service Tools

2.1 Tools and parts

The tools and parts to be used for maintenance are shown by icons.

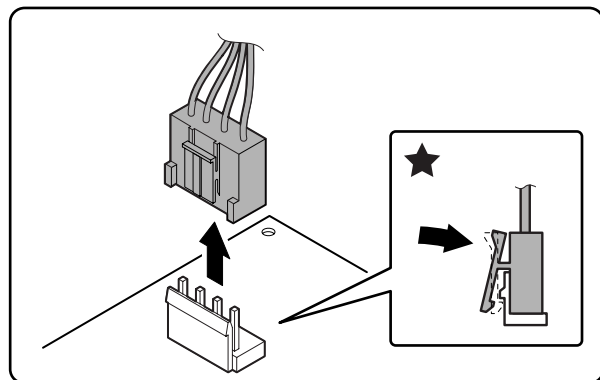
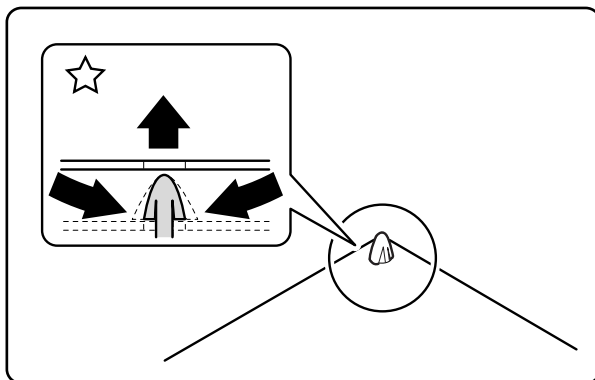
 Spanner (5.5, 8, 10, 17mm)	 Philips Head Screwdriver	 Long Nose Pliers	 C-Ring Pliers	 Snap Band	 Silicon Compound
					

2.2 Notes of disassembly and assembly

NOTE

When removing the locking type connectors and board supporters, disengage the locking mechanism first and then disconnect them.

Locking type connectors and board supporters are indicated in this manual using the following symbols; black star marks for locking connectors and white star marks for locking board supporters.



NOTE

During your maintenance or repair, please cut any tie-wraps necessary. However, after your maintenance or repair, please reassemble and tie-wrap all components and wiring in the same manner as before the maintenance or repair.

CAUTION

Please note that you remove each connector, grasp and pull out by the connector part only. Do not pull the harness (cable) part.

WARNING

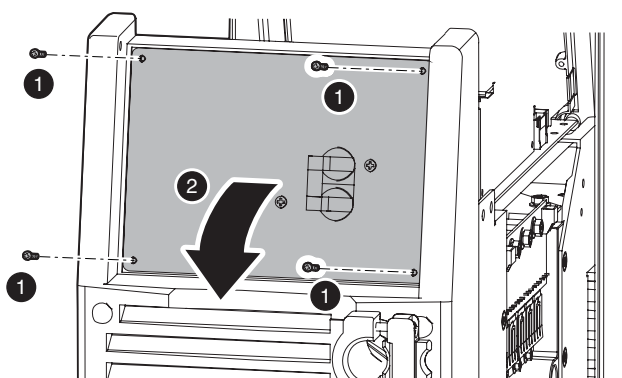
The capacitors inside the power supply will slowly discharged after you turn off the switch of the power supply or the switch at the breaker box (distribution panel). Wait at least 5 minutes for the discharge to complete.

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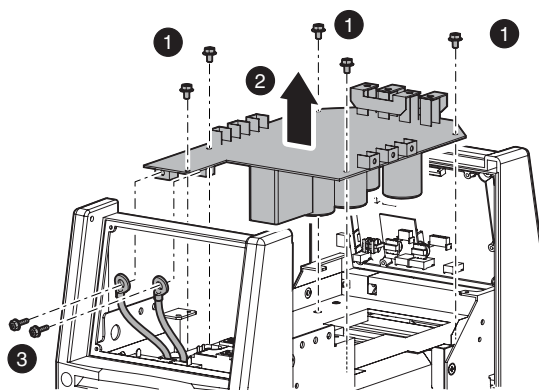
3 Replacement Procedure

3.1 PCB1 (WK-5477)

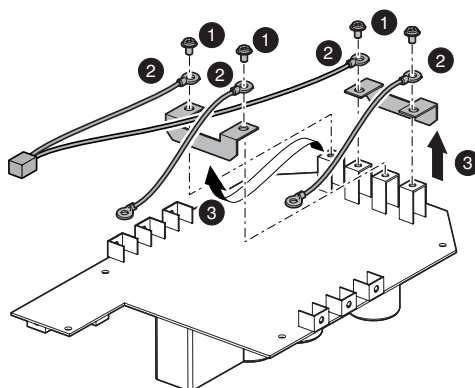
- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the PCB18 (WK-5861). [Reference page: 12-21]
- 3) Remove PCB2 (WK-5596). [Reference page: 12-7]
- 4) Remove the PCB8 (WK-5479). [Reference page: 12-11]
- 5) Remove the PCB9 (WK-5479). [Reference page: 12-12]
- 6) Remove the four screws. Pull out the Rear Control Cover and bring it down.



- 7) Remove the five screws and the PCB1 (WK-5477). Remove the two screws and two terminals.



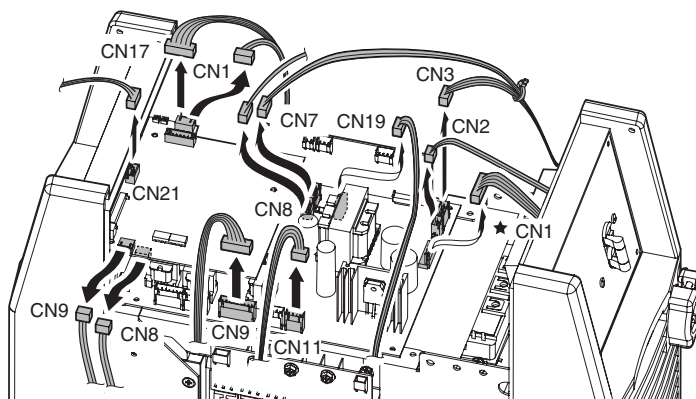
- 8) Remove the four screws and remove the four terminals and 200V Input Bus Bar.



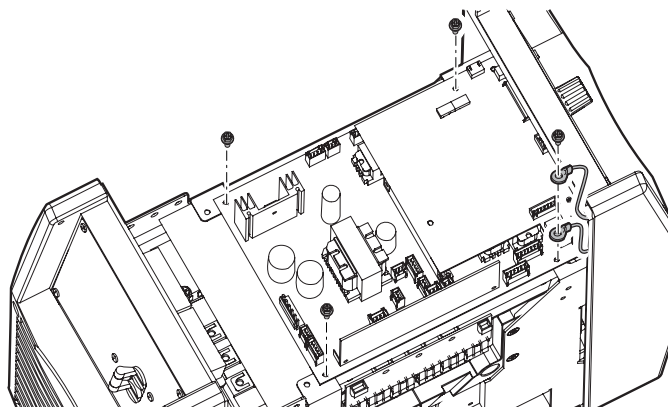
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3.2 PCB2 (WK-5596)

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the PCB18 (WK-5861). [Reference page: 12-11]
- 3) Disconnect the 13 connectors.



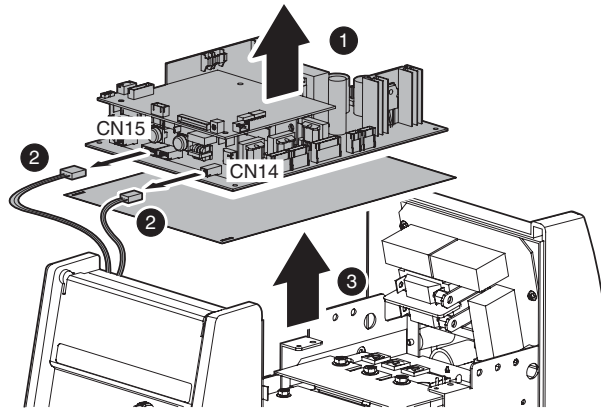
- 4) Remove the four screws and two ground terminals.



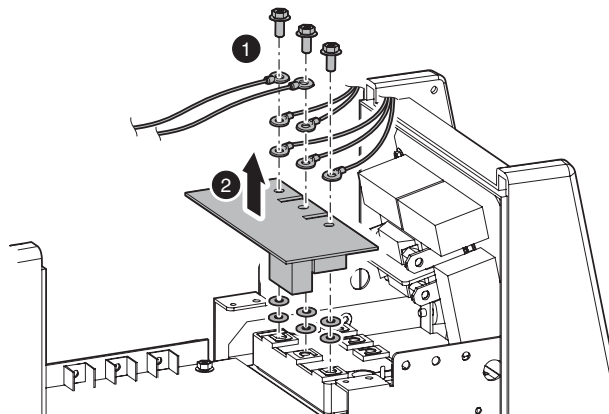
- 5) Remove the PCB3, PCB4, PCB5, PCB6, and PCB7 unit and then disconnect the two connectors.

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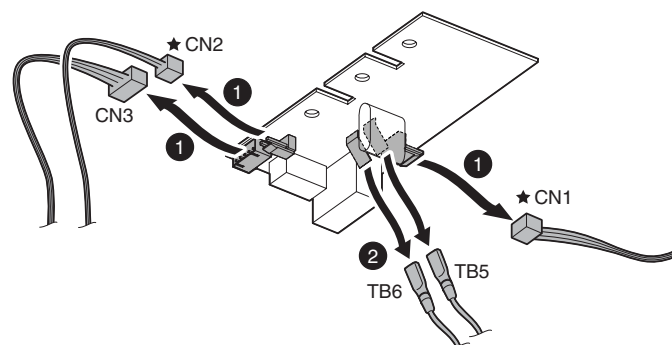
Remove the Insulated Sheet.



6) Remove the three screws and seven terminals. Remove the PCB2 (WK-5596).



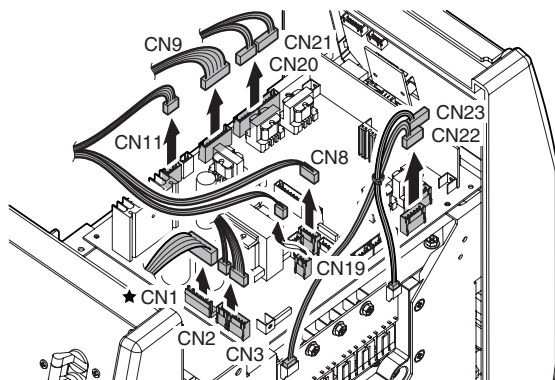
7) Disconnect the three connectors and two terminal from the PCB2 (WK-5596).



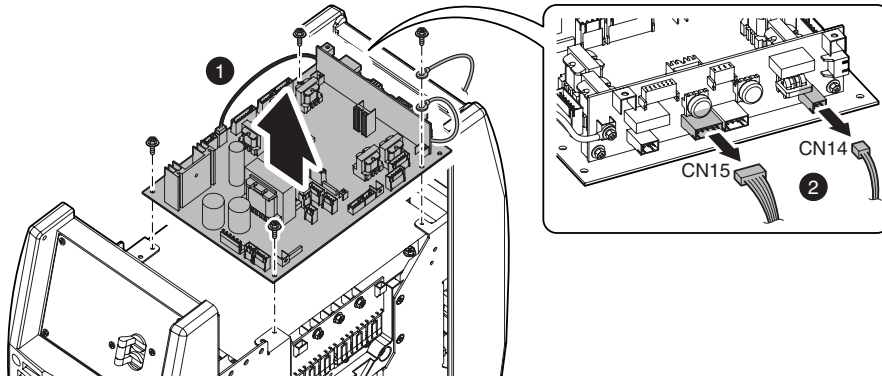
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3.3 PCB3 (WK-5548), PCB5 (WK-5551) Ⓢ

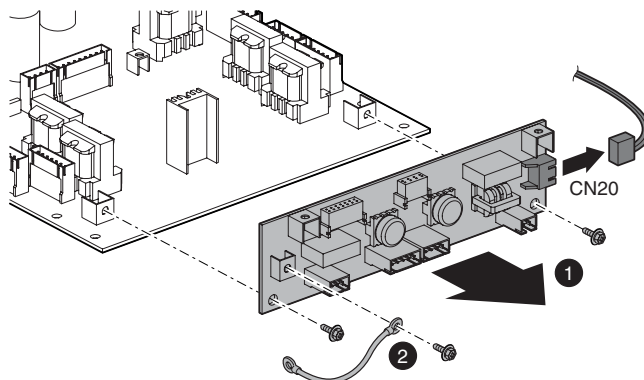
- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove PCB4 (WK-4819). [Reference page: 12-10]
- 3) Remove PCB6 (WK-5549). [Reference page: 12-10]
- 4) Remove PCB7 (WK-5550). [Reference page: 12-11]
- 5) Disconnect the 11 connectors.



- 6) Remove the four screws and then the two ground terminals. Remove the PCB3 and PCB5 unit. Disconnect the two connectors.

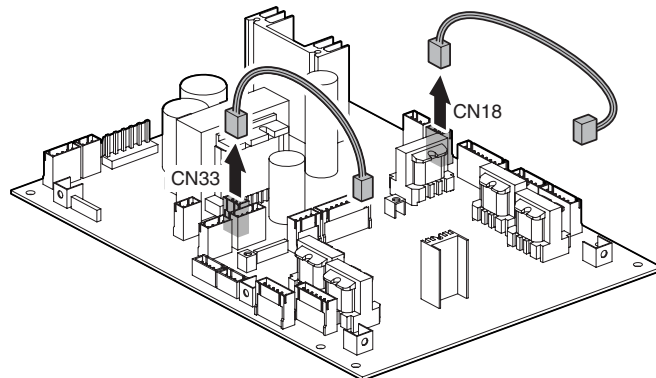


- 7) Disconnect the one connector and remove the two screws, and then remove the PCB5 (WK-5551) from the PCB3 (WK-5548). Remove the one screw and one ground terminal from the PCB5 (WK-5551).



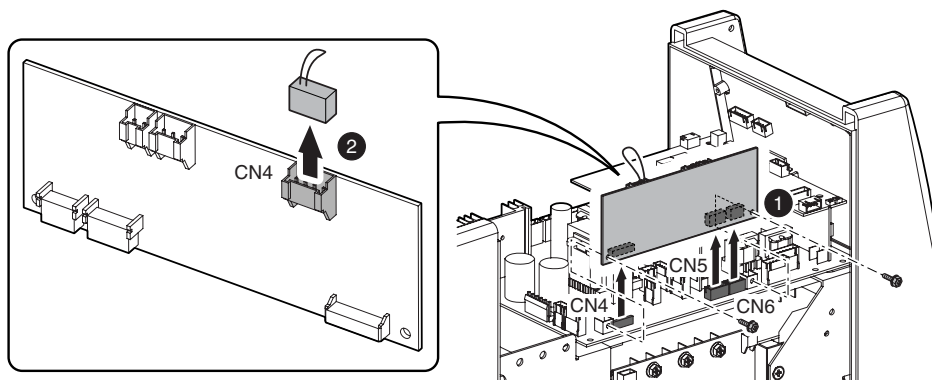
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- 8) Disconnect the two connectors from the PCB3 (WK-5548).



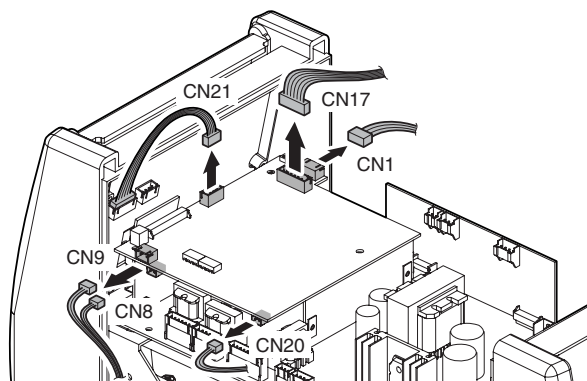
3.4 PCB4 (WK-4819) ⊕

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the two screws and three connectors and remove the PCB4 (WK-4819). Disconnect the one connector.



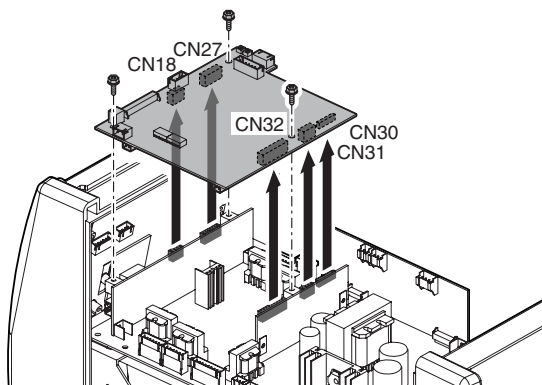
3.5 PCB6 (WK-5549) ⊕

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Disconnect the six connectors.



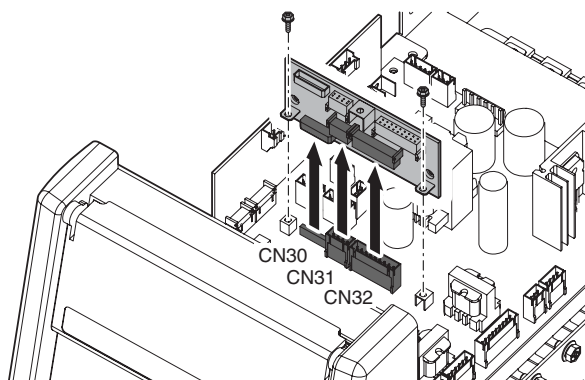
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- 3) Remove the three screws and five connectors. Remove the PCB6 (WK-5549).



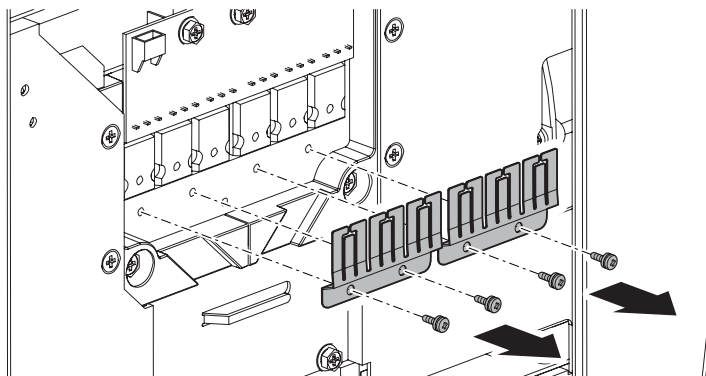
3.6 PCB7 (WK-5550) ⊕

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the PCB6 (WK-5549). [Reference page: 12-10]
- 3) Remove the two screws and three connectors. Remove the PCB7 (WK-5550).



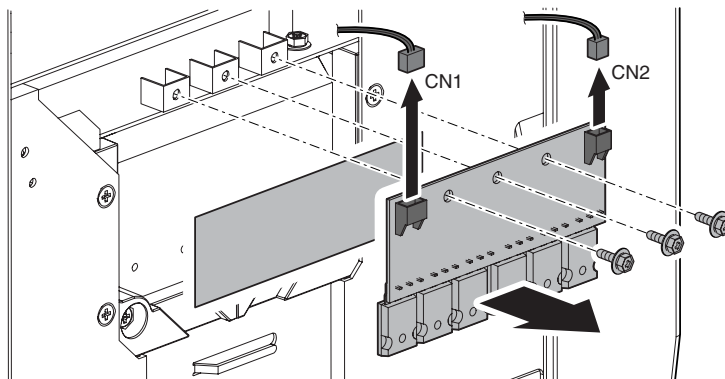
3.7 PCB8 (WK-5479) (IGBT (Q1~Q6)) ⊕

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the four screws and two IGBT Chassis.

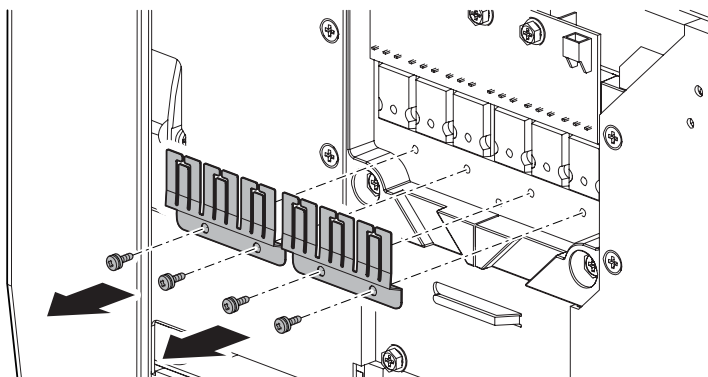


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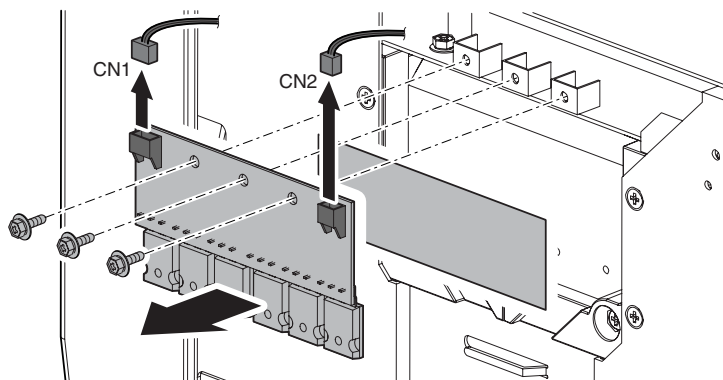
- 3) Remove the two connectors and three screws. Remove the PCB8 (WK-5479).
- Remember to install silicone rubber sheets when reinstalling the PCB8 (WK-5479).

**3.8 PCB9 (WK-5479) (IGBT (Q7~Q12))**

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the four screws and two IGBT Chassis.



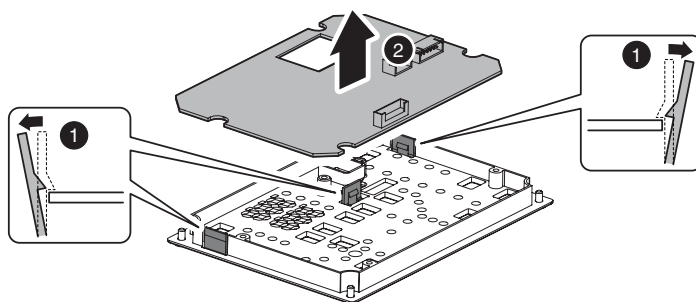
- 3) Remove the two connectors and three screws. Remove the PCB9 (WK-5479).
- Remember to install silicone rubber sheets when reinstalling the PCB9 (WK-5479).



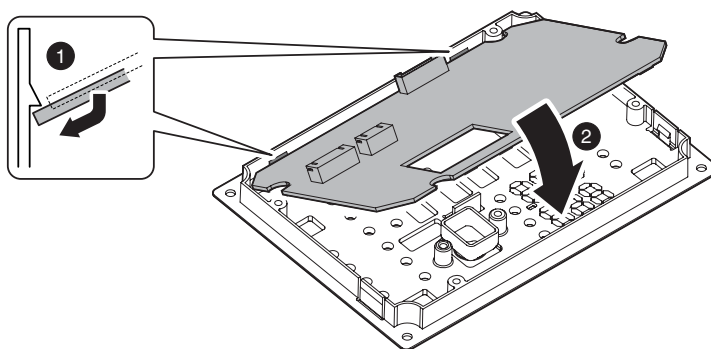
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3.9 PCB10 (WK-5527)

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the PCB11 (WK-5528). [Reference page: 12-13]
- 3) Remove the three latches of Front Control Cover and then the PCB10 (WK-5527).

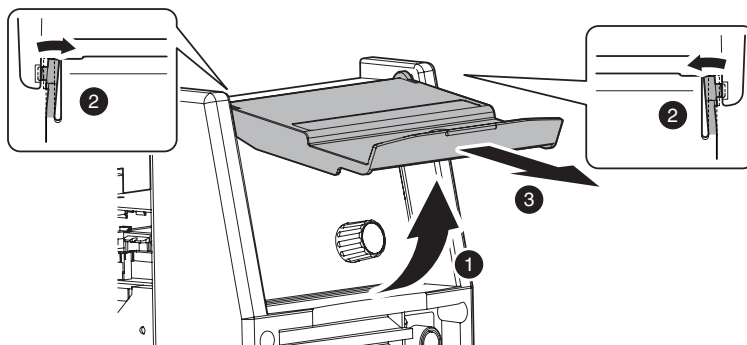


- When reinstalling the PCB10 (WK-5527), engage two latches of Front Control Cover first.



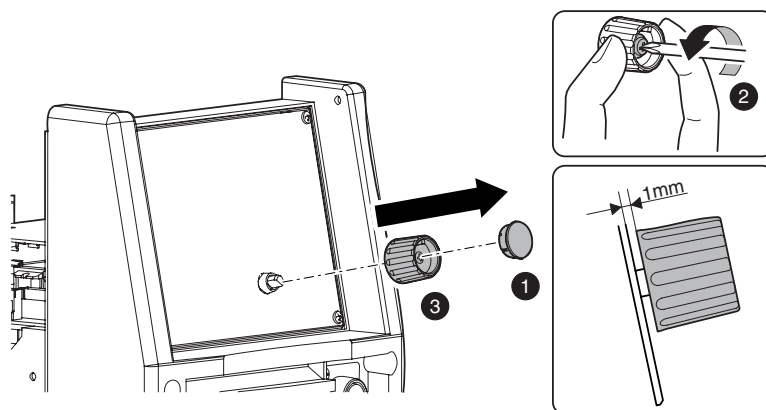
3.10 PCB11 (WK-5528)

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the Protection Cover.

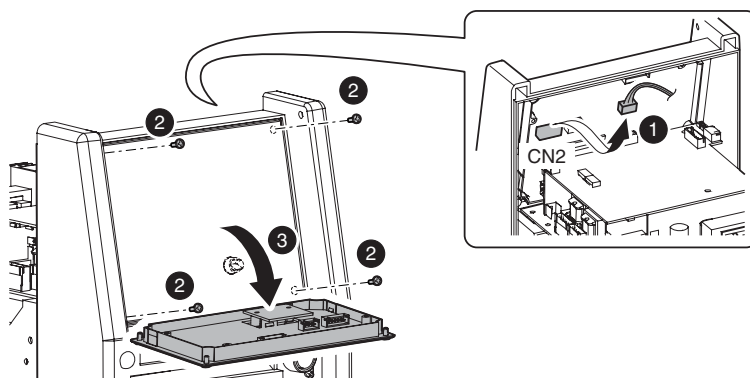


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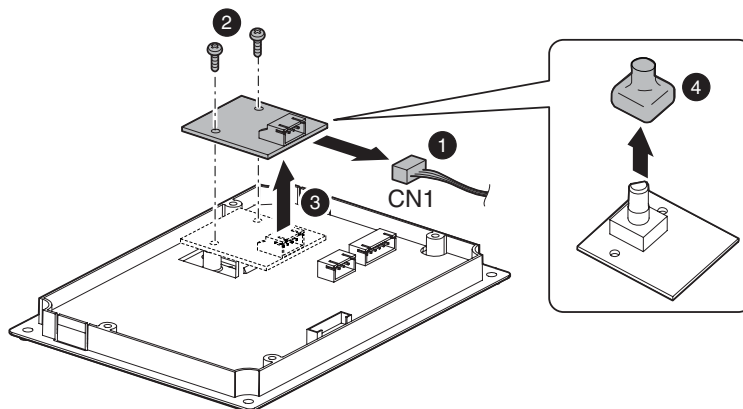
- 3) Remove the Knob Cap. Holding the Knob down, loosen the screw and remove the Knob.



- 4) Disconnect the one connector from the PCB10 (WK-5527). Remove the four screws. Pull out the Operation Panel and bring it down.

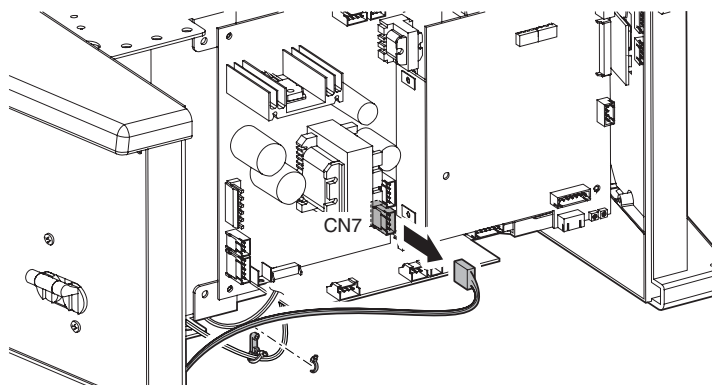


- 5) Remove the one connector and two screws. Remove the PCB11 (WK-5528). Remove the Encoder Cover from the PCB11 (WK-5528).

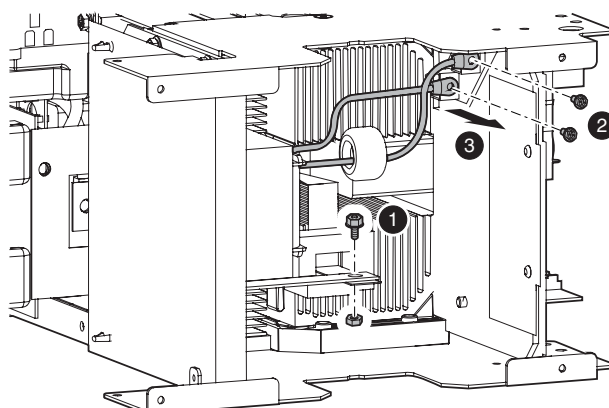


13 MAINTENANCE**3.11 PCB12 (WK-5615), Transformer (T1), Current Trans (CT2) ⚠ ⚡ ⚠**

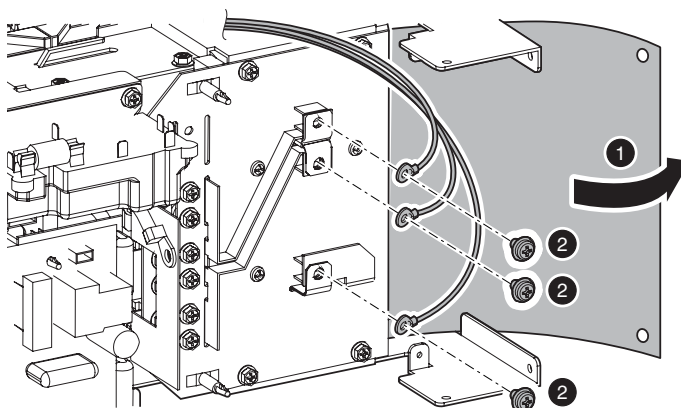
- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove PCB13 (WK-5569). [Reference page: 12-18]
- 3) Disconnect the one connector and cut the one snap band.



- 4) Remove the one screw and one nut. Remove the two screws and remove the two terminals.

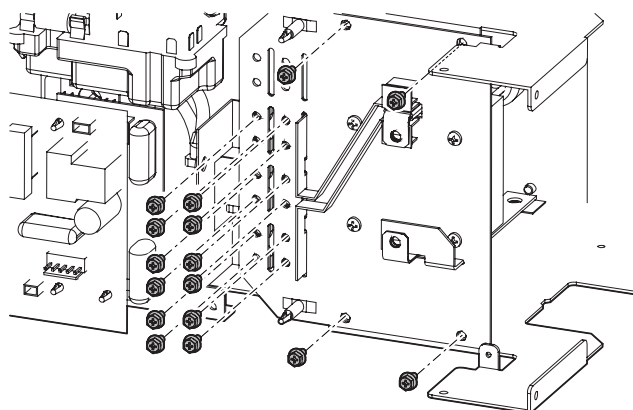


- 5) Open the Dust Cover Sheet. Remove the three screws and three terminals.

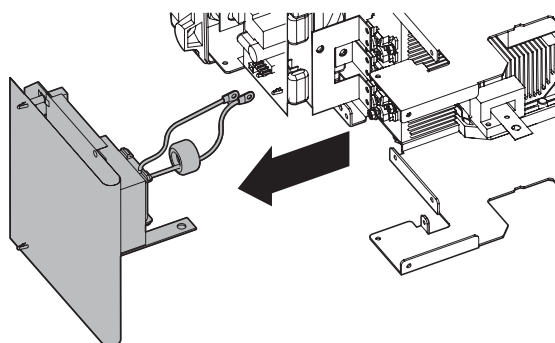


13 MAINTENANCE

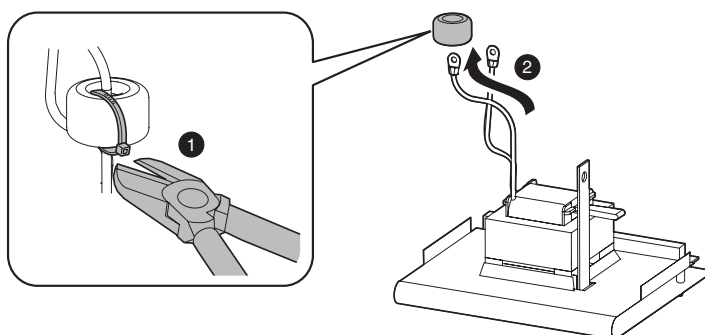
6) Remove the 16 screws.



7) Remove the PCB12 and T1 unit.

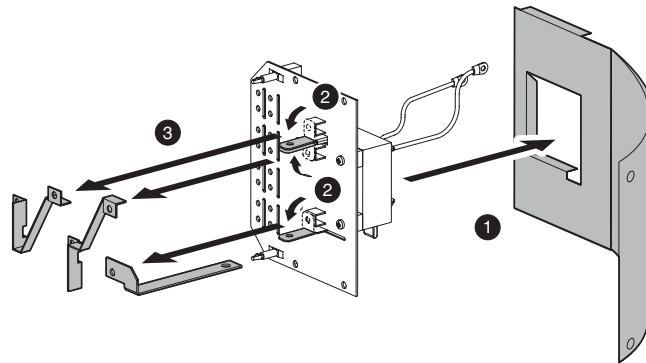


8) Cut the one snap band and remove the Current Trans (CT2).

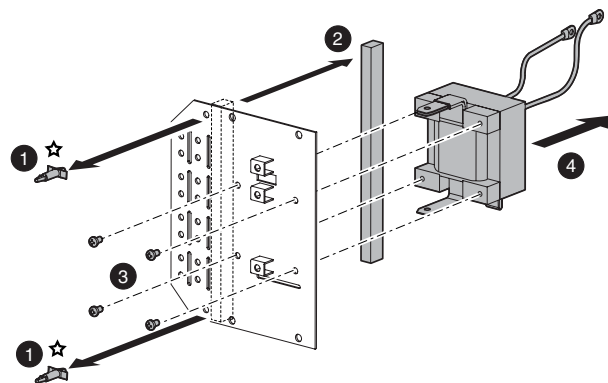


13 MAINTENANCE

- 9) Remove the Dust Cover Sheet. Extend the electrode and remove the T-D Bus Bar1, T-D Bus Bar2 and T Center Bus Bar.

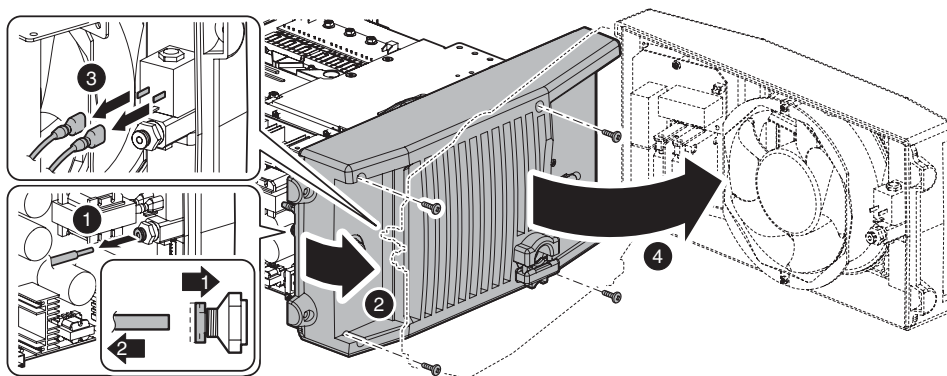


- 10) Remove the two PCB supporters and cushion.
Remove the four screws and remove the Main Trans (T1).

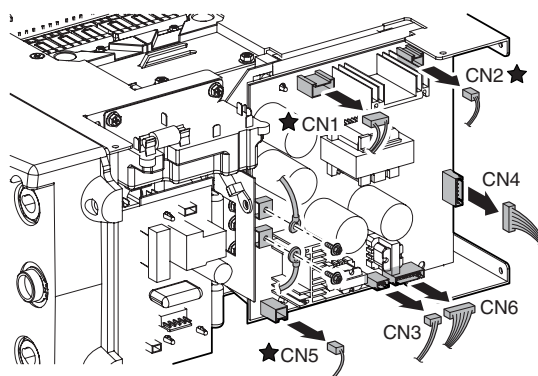


13 MAINTENANCE**3.12 PCB13 (WK-5569) ⓘ**

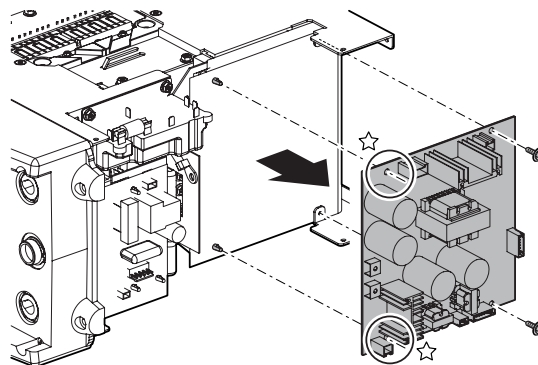
- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the Nylon Hose. Remove the four screws. Remove the two terminals and open the Rear Panel.



- 3) Disconnect the six connectors and remove the two screws and two terminals.



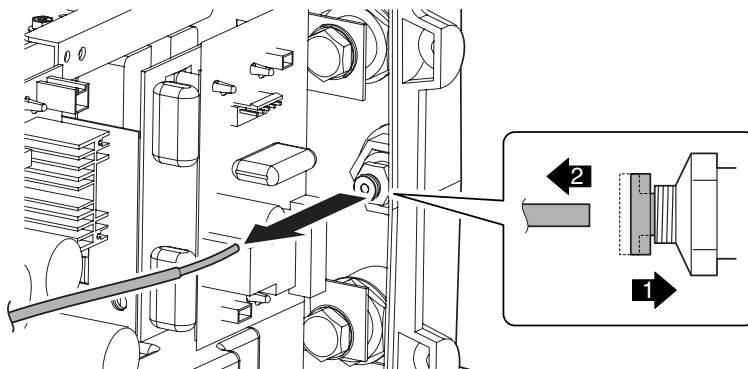
- 4) Remove the two screws and two PCB supporters and remove the PCB13 (WK-5569).



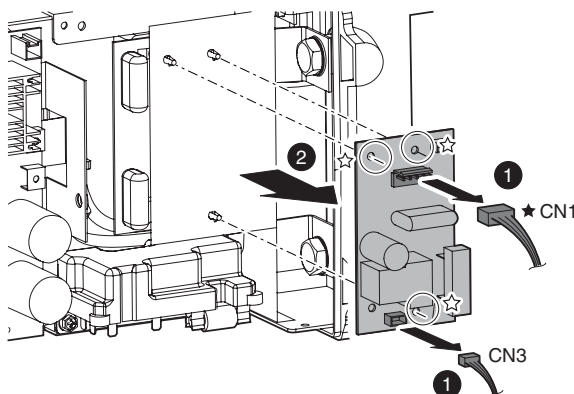
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3.13 PCB16 (WK-5499)

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the Nylon Hose.

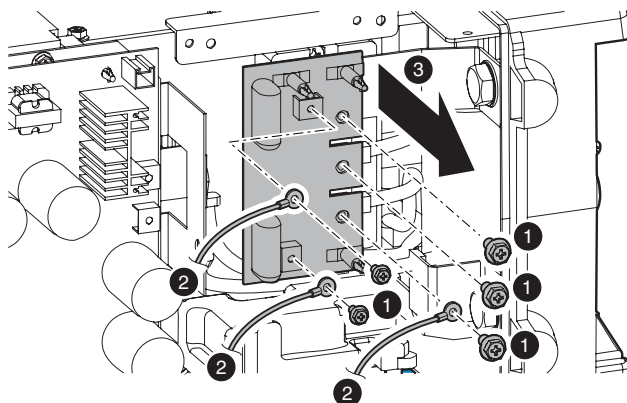


- 3) Disconnect the two connectors.
Remove the three PCB supporters and remove the PCB16 (WK-5499).



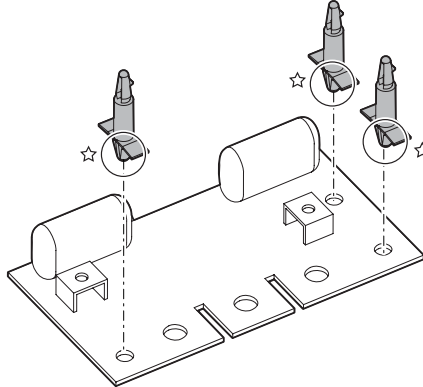
3.14 PCB14 (WK-5570)

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the PCB16 (WK-5499). [Reference page: 12-19]
- 3) Remove the five screws and three terminals and remove the PCB14 (WK-5570).

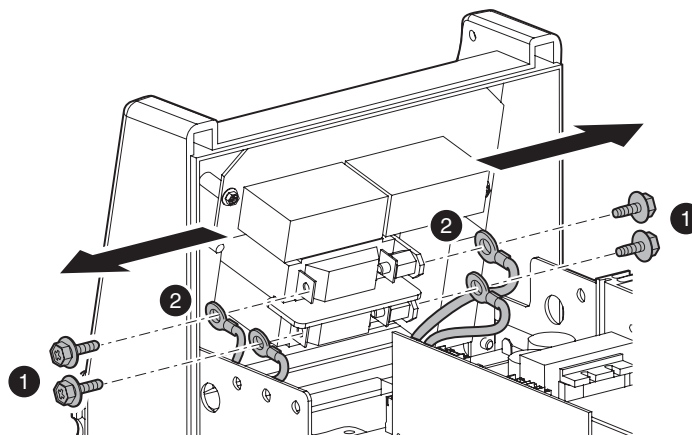


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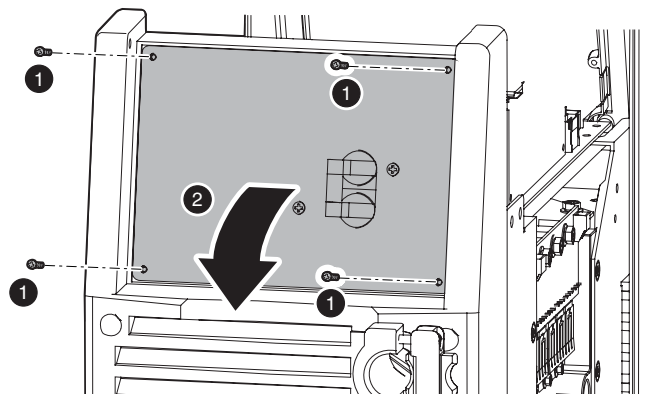
- 4) Remove the three PCB supporters from the PCB14 (WK-5570).

**3.15 PCB17 (WK-4917) ⊕**

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the four screws and four terminals.

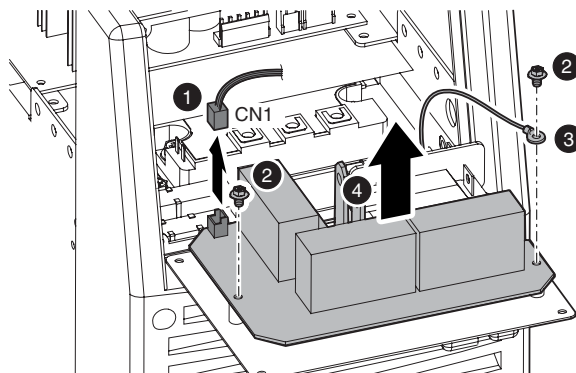


- 3) Remove the four screws and then open the Rear Board.

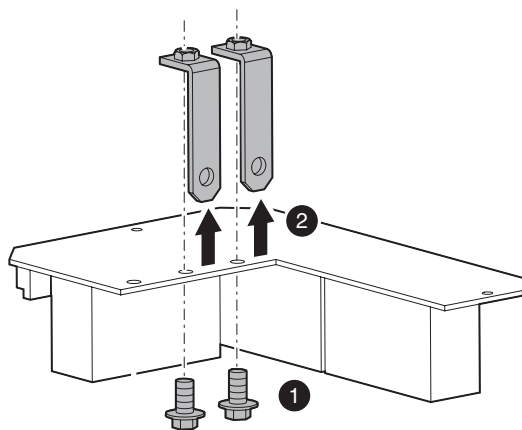


13 MAINTENANCE

- 4) Disconnect the one connector.
Remove the two screws and one ground terminal and remove the PCB17 unit.

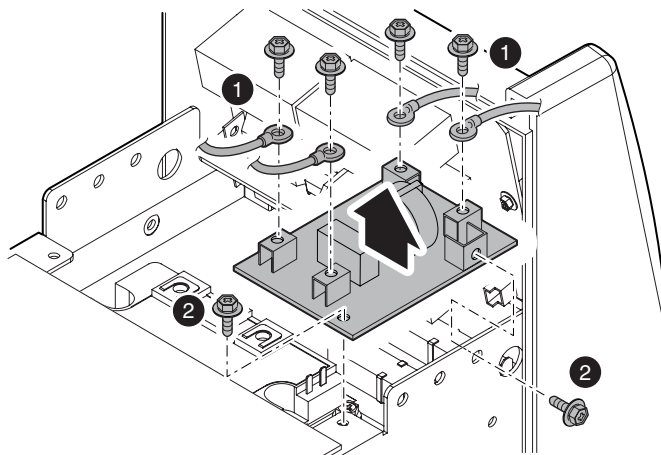


- 5) Remove the two screws and remove the S1 Bus Bar from the PCB17 (WK-4917).



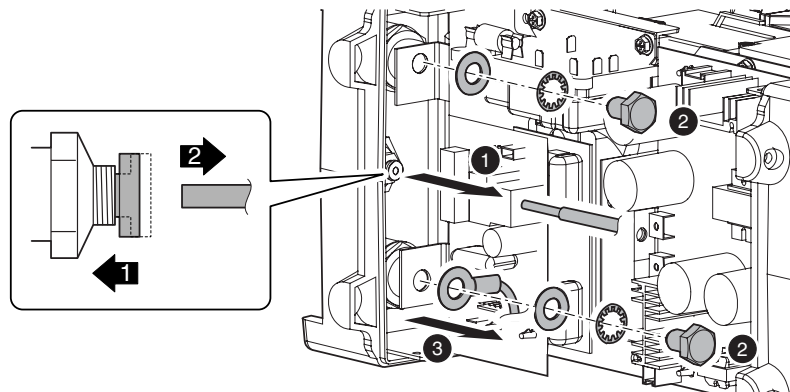
3.16 PCB18 (WK-5861) ⊕

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the four screws and then remove the four cables. Remove the two screws. Remove the PCB18 (WK-5861).

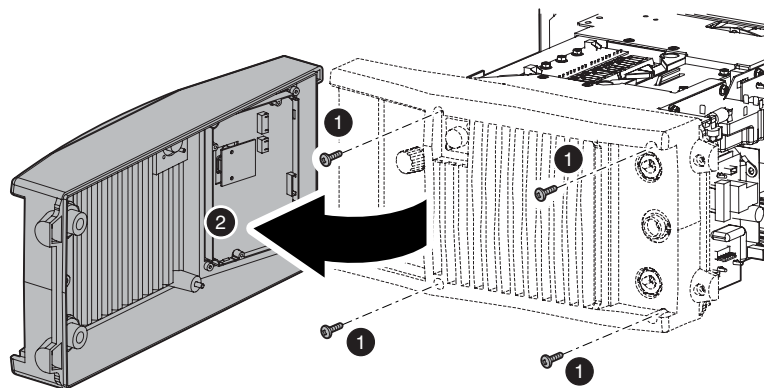


13 MAINTENANCE**3.17 Discharge Resistor (R3) ⚠ ⚡ ⚠**

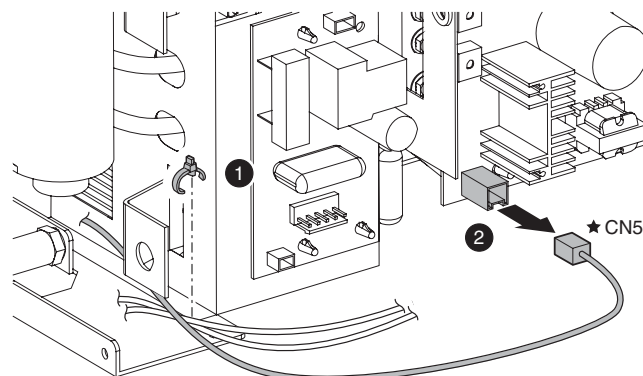
- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the Nylon Hose. Remove the two bolts, two toothed washers, one washer, and one terminal.



- 3) Remove the four screws and open the Front Panel.

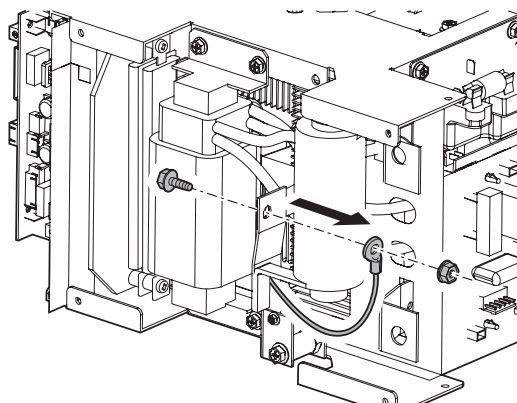


- 4) Cut the one snap band and disconnect the one connector.

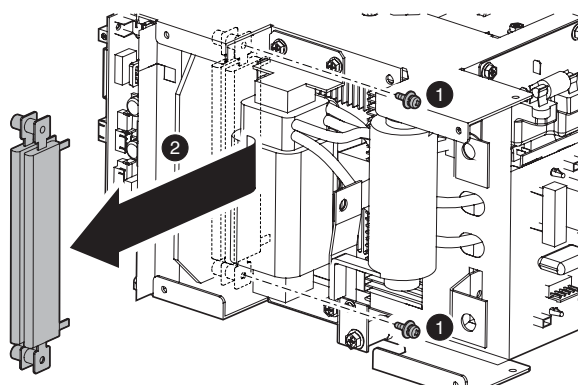


13 MAINTENANCE

- 5) Remove the one screw and one nut and remove the one terminal.

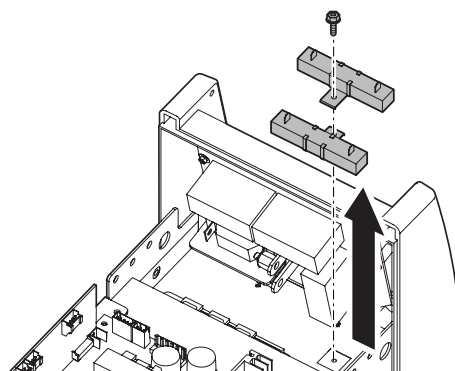


- 6) Remove the two screws and remove the Discharge Resistor (R3).



3.18 Current Limiting Resistor (R4, R5) ⊕

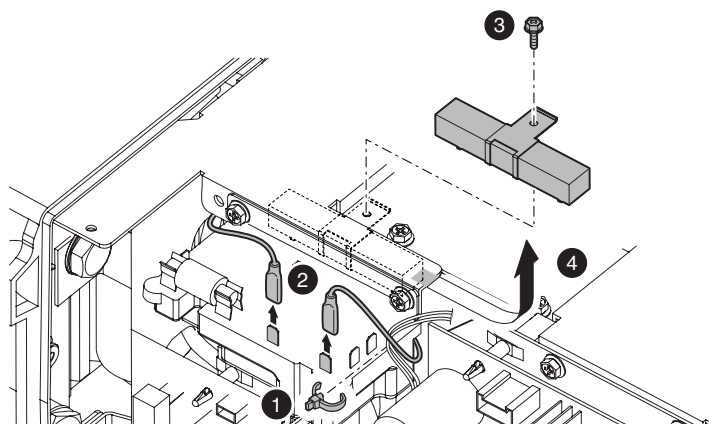
- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the PCB18 (WK-5861). [Reference page: 12-21]
- 3) Remove the PCB2 (WK-5596). [Reference page: 12-7]
- 4) Remove the one screw and remove the Current Limiting Resistor (R4, R5).



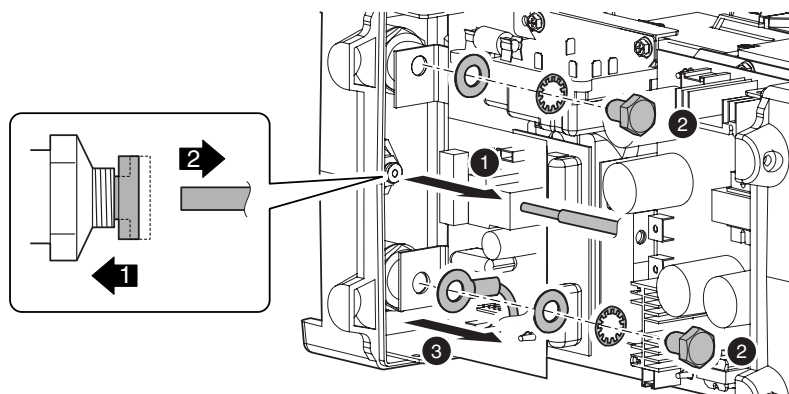
13 MAINTENANCE

3.19 Resistor on High Frequency Unit (R6) ⚠ ⚡ ⚠

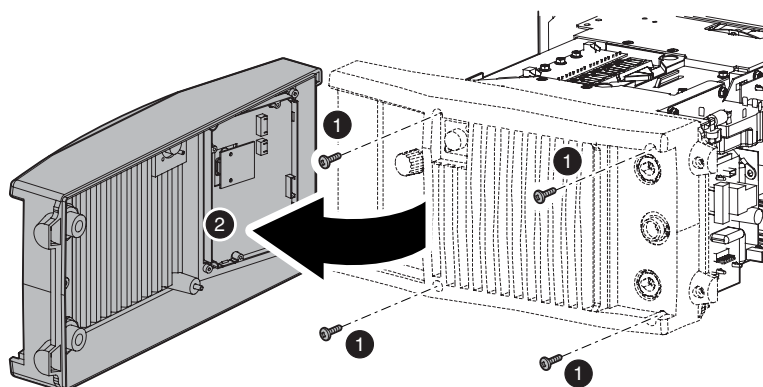
- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Cut the one snap band and remove the two terminals. Remove the one screw and remove the Resistor on High Frequency Unit (R6).

**3.20 Coupling Coil (CC1)** ⚠ ⚡

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the Nylon Hose. Remove the two bolts, two toothed washers, one washer, and one terminal.

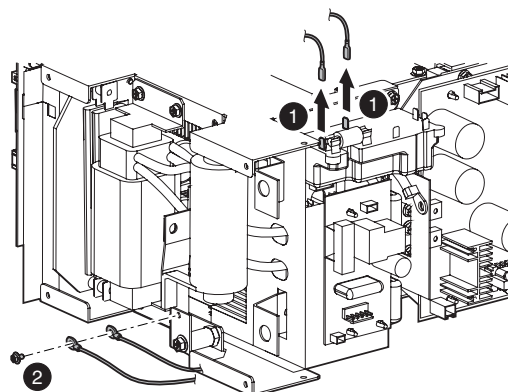


- 3) Remove the four screws and open the Front Panel.

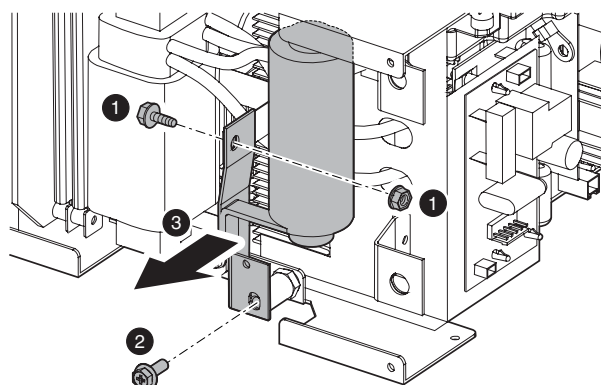


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- 4) Remove the two terminals. Remove the one screw and two terminals.

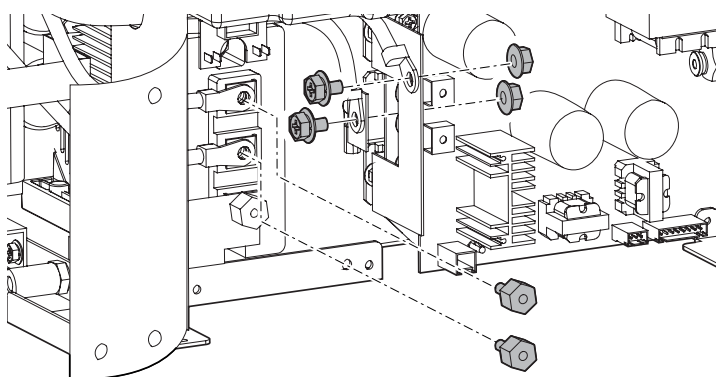


- 5) Remove the one screw and one nut. Remove the one screw and Coupling Coil (CC1).



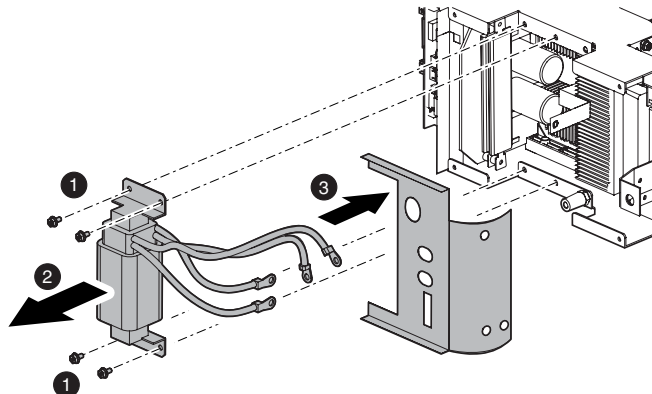
3.21 Reactor (FCH1)

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the PCB16 (WK-5499). [Reference page: 12-19]
- 3) Remove the PCB14 (WK-5570). [Reference page: 12-19]
- 4) Remove the Coupling Coil (CC1). [Reference page: 12-24]
- 5) Remove the two posts, two screws and two nuts.

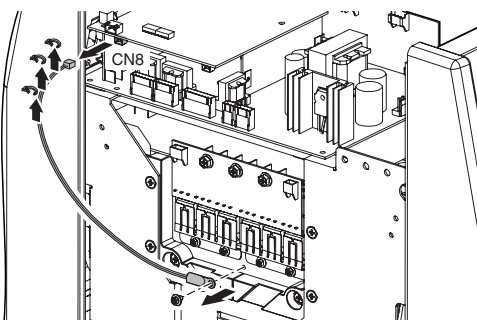


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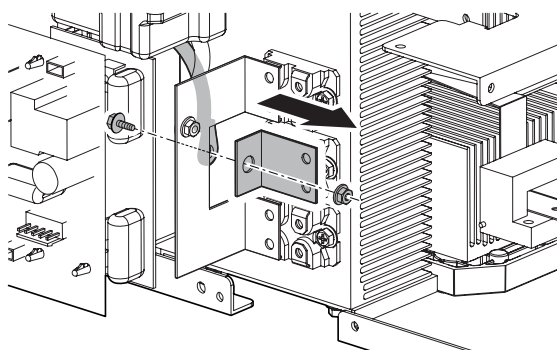
- 6) Remove the four screws and remove the Reactor (FCH1). Remove the Insulating Sheet.

**3.22 Primary Thermistor (TH1)**

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Cut the three snap bands. Disconnect the one connector.
Remove the one screw and then detach the Primary Thermistor (TH1).
 - Before installing a new thermistor, apply a uniform coat of silicone compound (Shinetsu Silicone G-747 or equivalent) on the base.

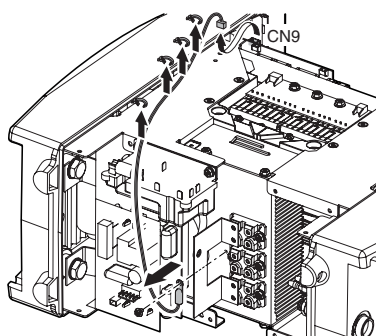
**3.23 Secondary Thermistor (TH2)**

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the PCB13 (WK-5569). [Reference page: 12-18]
- 3) Remove the PCB12 (WK-5615). [Reference page: 12-15]
- 4) Remove the one screw and one nut and remove the bus bar.



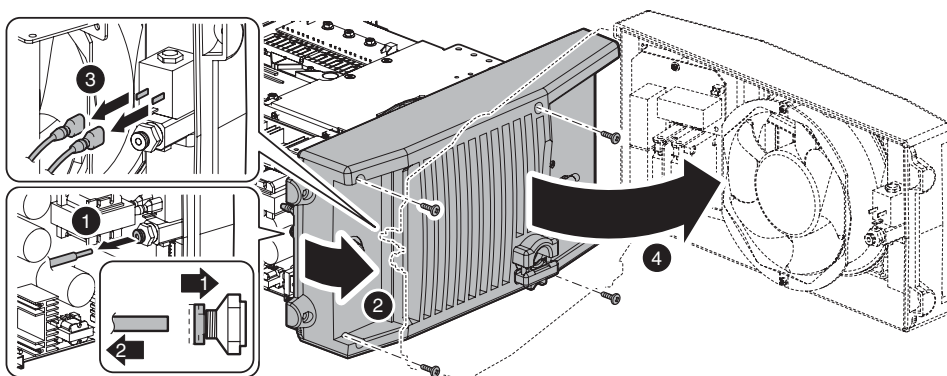
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- 5) Cut the four snap bands. Disconnect the one connector.
Remove the one screw and then detach the Secondary Thermistor (TH2).
 - Before installing a new thermistor, apply a uniform coat of silicone compound (Shinetsu Silicone G-747 or equivalent) on the base.

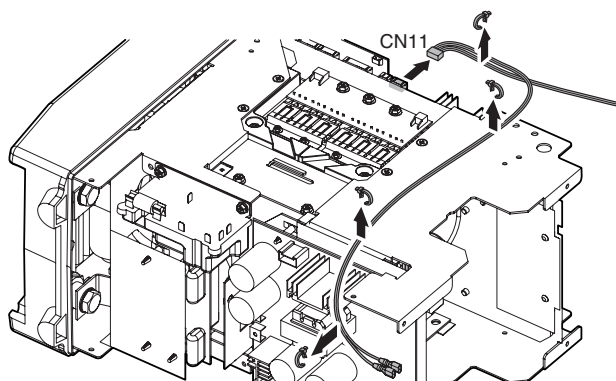


3.24 Cooling Fan (FAN1) ⚠ ⚡ ⚠

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the Nylon Hose. Remove the four screws. Remove the two terminals and open the Rear Panel.

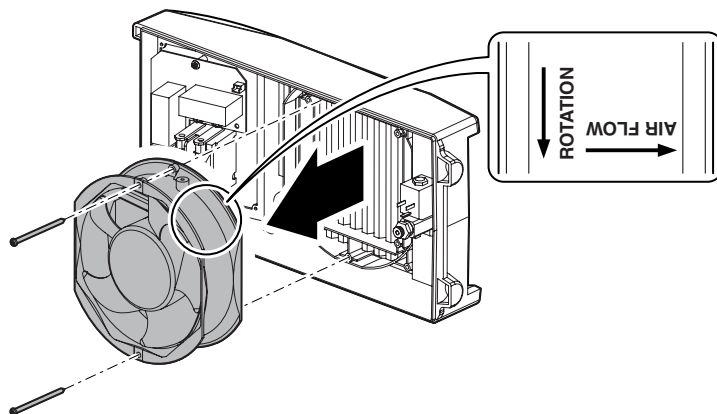


- 3) Cut the four snap bands and disconnect the one connector.



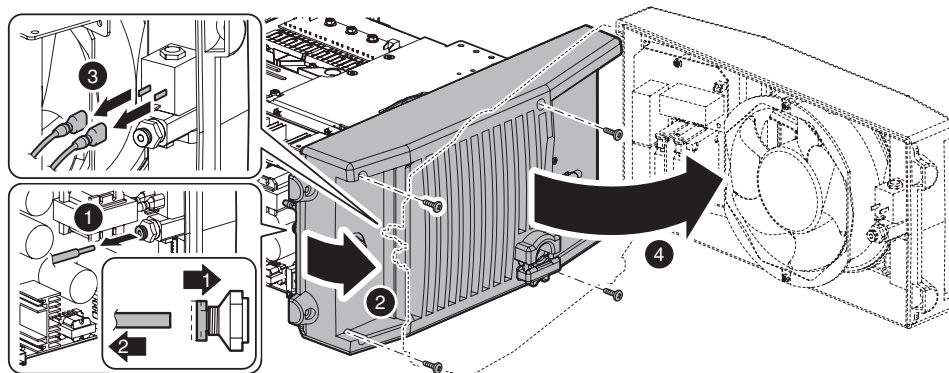
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- 4) Remove the two screws and detach the Cooling Fan (FAN1).
 - Do not have the wrong direction of the fan when reinstalling.

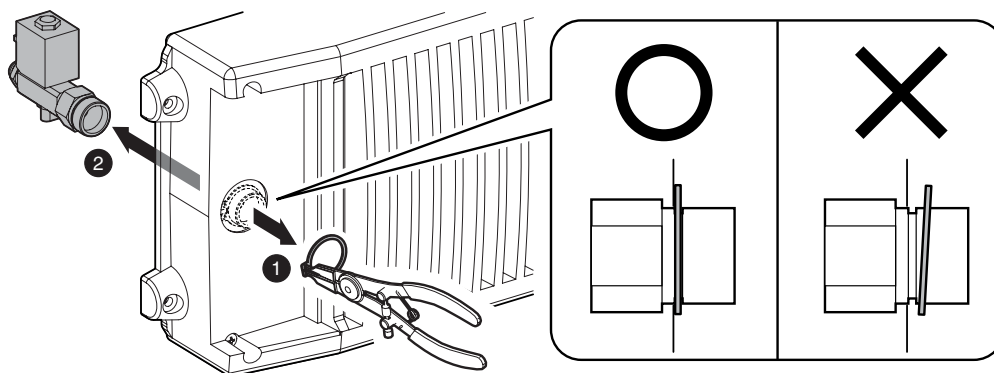


3.25 Solenoid Valve (SOL1)

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the Nylon Hose. Remove the four screws. Remove the two terminals and open the Rear Panel.

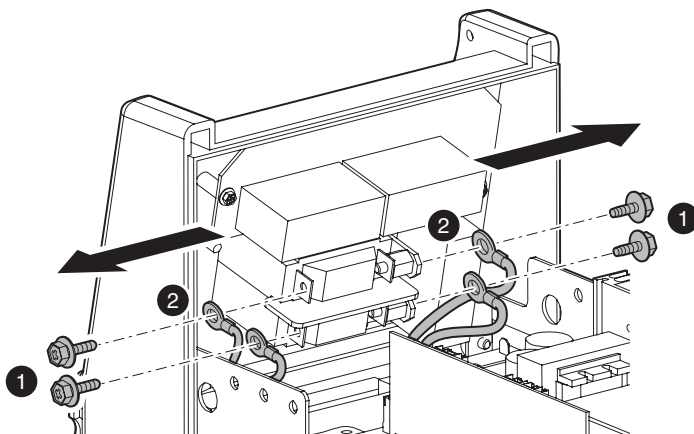


- 3) Remove the C-ring and detach the Solenoid Valve (SOL1).
 - When reinstalling, make sure that the C-ring seats in the solenoid valve groove.

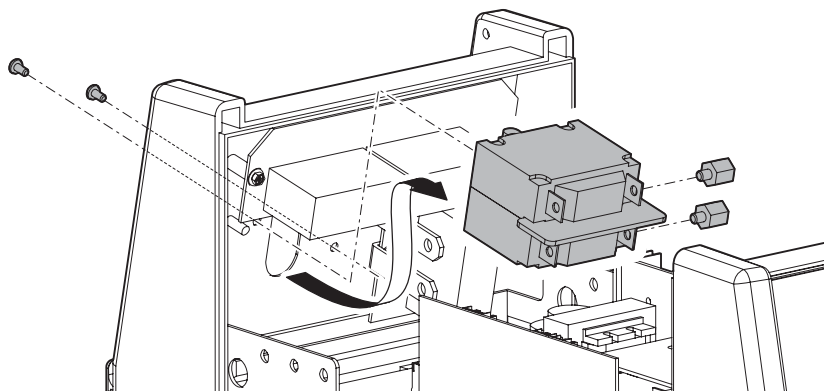


13 MAINTENANCE**3.26 Main ON/OFF Switch (S1) **

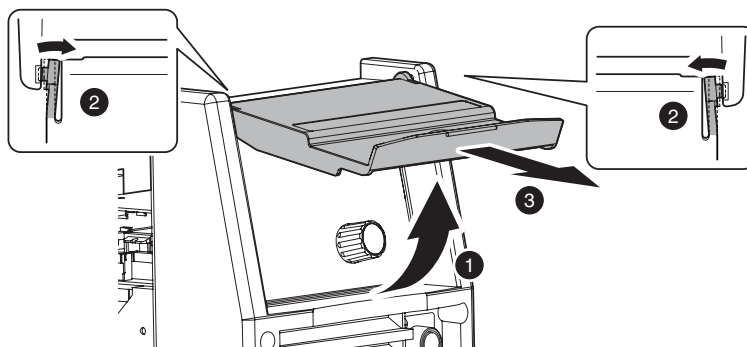
- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the four screws and four terminals.



- 3) Remove the two screws and detach the Main ON/OFF Switch (S1). Remove the two posts.

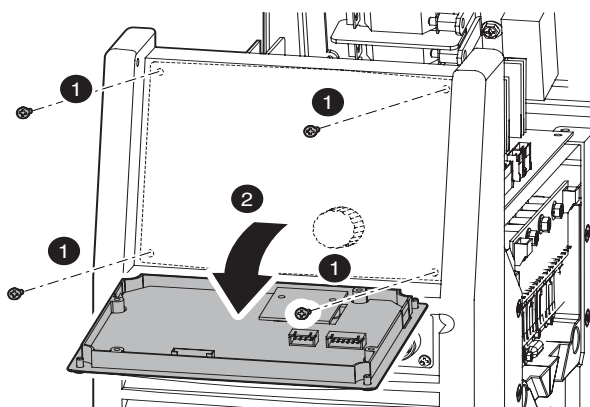
**3.27 Remote Connector (CON1) **

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the Protection Cover.

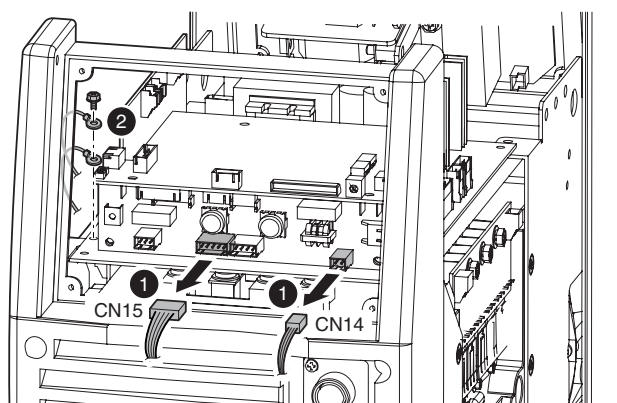


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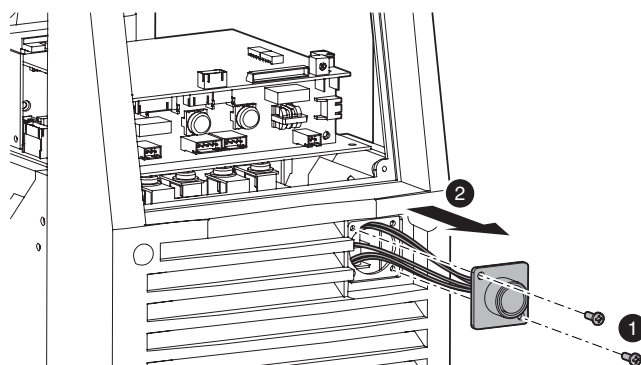
- 3) Remove the four screws. Pull out the Front Control Cover and bring it down.



- 4) Disconnect the two connectors. Remove the one screw and two ground terminals.

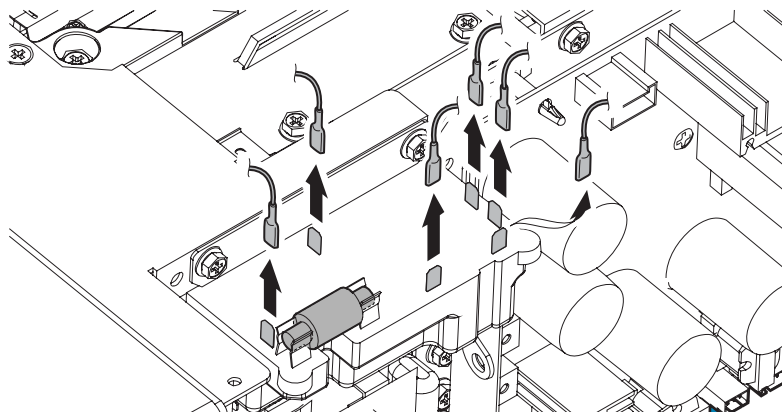


- 5) Remove the two screws and Remote Socket (CON1).

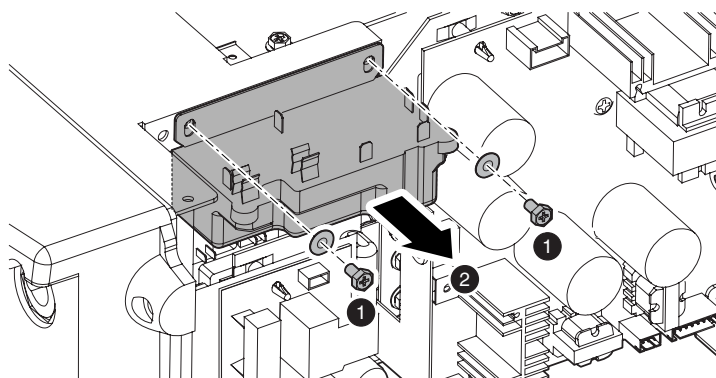


13 MAINTENANCE**3.28 High Frequency Unit (HF.UNIT1) ☒⊕**

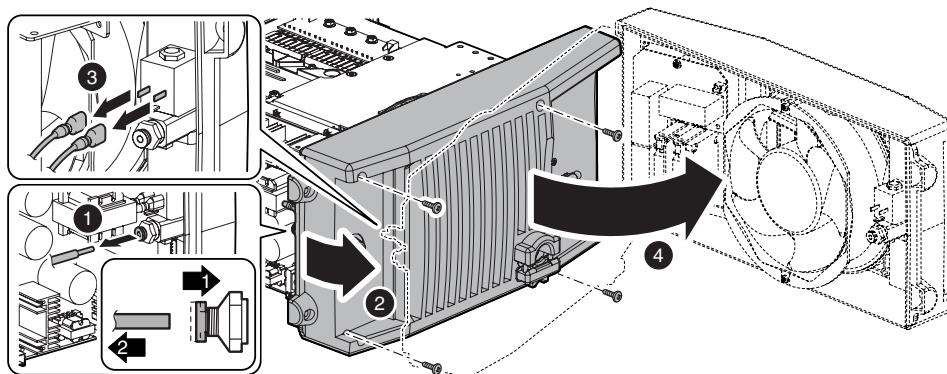
- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the High Frequency Gap. Remove the six terminals.



- 3) Remove the two screws, two washers and detach the High Frequency Unit (HF. UNIT1).

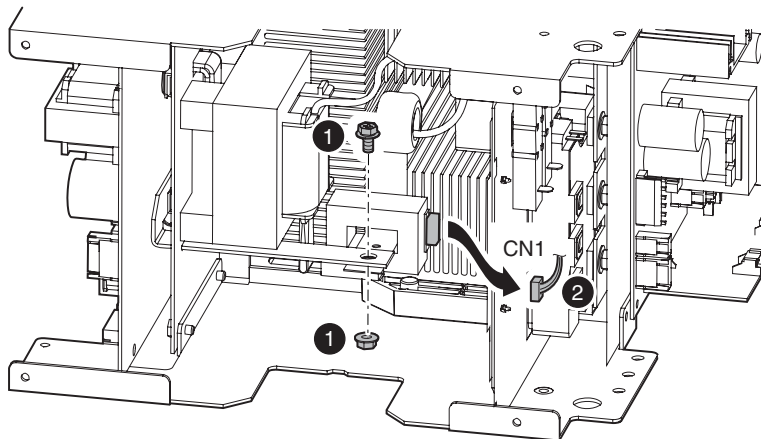
**3.29 Hall C.T. (HCT1) ☒⊕**

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the Nylon Hose. Remove the four screws. Remove the two terminals and open the Rear Panel.

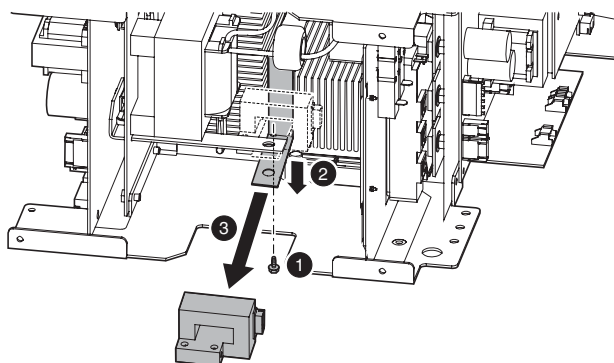


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- 3) Remove the one screw and one nut. Disconnect the one connector.

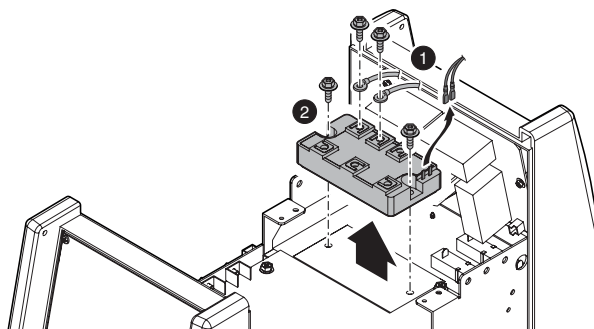


- 4) Remove the one screw. Remove the Hall C. T. (HCT1) while slightly pressing down the bus bar.



3.30 Primary Diode (D1) ⚠⚡⊕

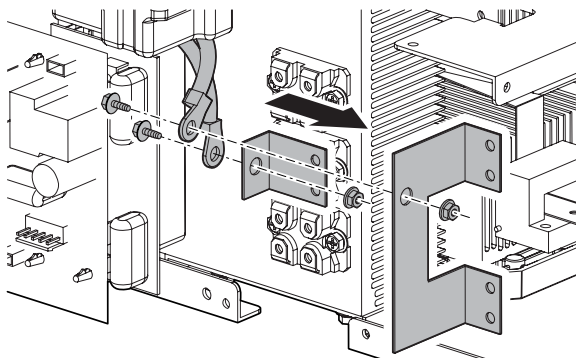
- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the PCB18 (WK-5861). [Reference page: 12-21]
- 3) Remove the PCB2 (WK-5596). [Reference page: 12-7]
- 4) Remove the two screws and four terminals. Remove the two screws and then detach the Primary Diode (D1).
 - Before installing a new diode, apply a uniform coat of silicone compound (Shinetsu Silicone G-747 or equivalent) on the base.



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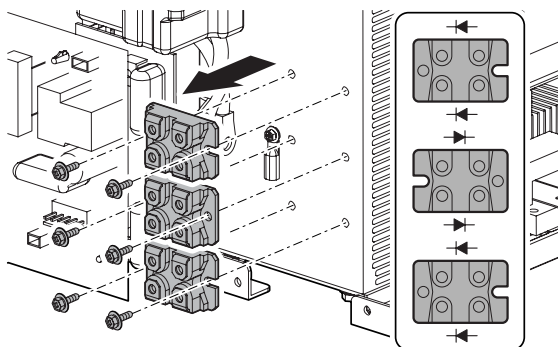
3.31 Secondary Diode (D2, D4, D5)

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the PCB13 (WK-5569). [Reference page: 12-18]
- 3) Remove the PCB12 (WK-5615). [Reference page: 12-15]
- 4) Remove the two screws and two nuts and remove the bus bar.



- 5) Remove the six screws and then detach the Secondary Diode (D2, D4, D5).

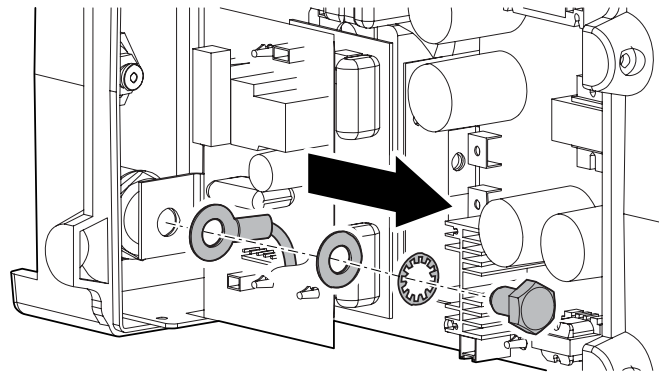
- Do not have the wrong direction of the diodes when reinstalling.
Before installing a new diode, apply a uniform coat of silicone compound (Shinetsu Silicone G-747 or equivalent) on the base.



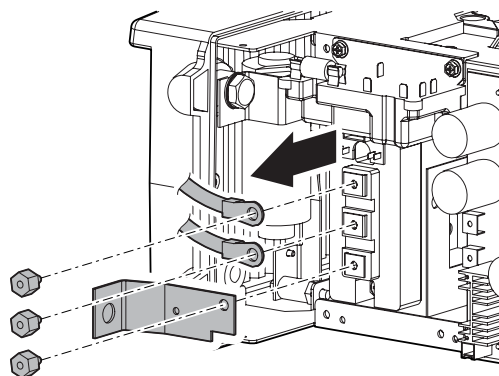
13 MAINTENANCE

3.32 Secondary IGBT (Q13) (PCB15 (WK-3367))

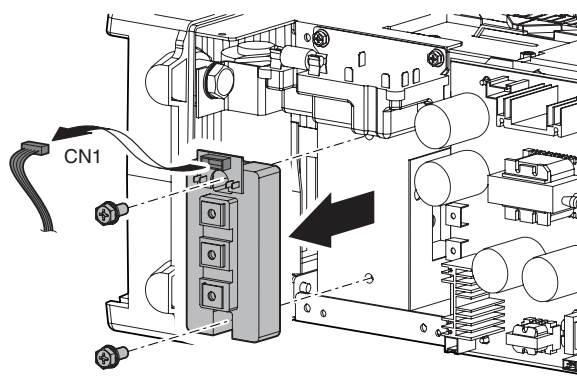
- 1) Remove the side cover. [Reference page: 11-1]
- 2) Remove the PCB16 (WK-5499). [Reference page: 12-19]
- 3) Remove the PCB14 (WK-5570). [Reference page: 12-19]
- 4) Remove the one bolt and remove the one toothed washer, one washer and one terminal.



- 5) Remove the three posts, bus bar and two terminals.



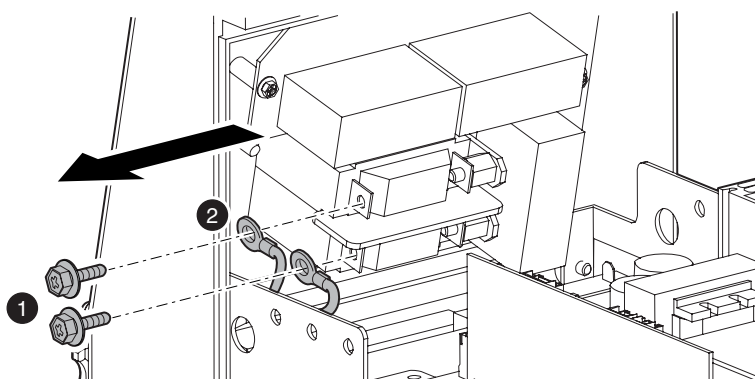
- 6) Remove the one connector and two screws and remove the Secondary IGBT (Q13).
 - Before installing a new IGBT, apply a uniform coat of silicone compound (Shinetsu Silicone G-747 or equivalent) on the base.



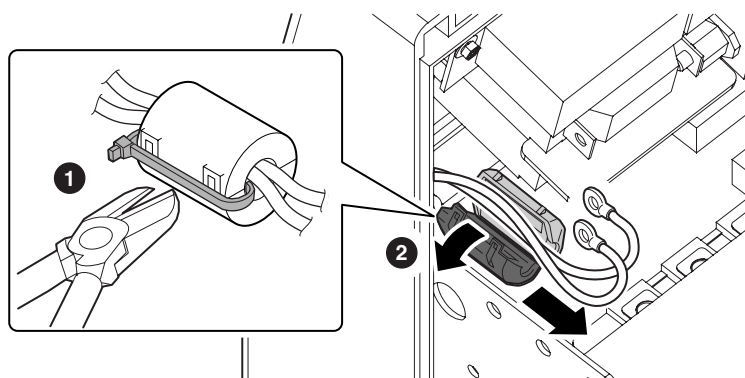
13 MAINTENANCE

3.33 Reactor (L101) ⚠ ⚡ ⚠

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the Earth Inductance (L103). [Reference page: 12-35]
- 3) Remove the two screws and two cables.

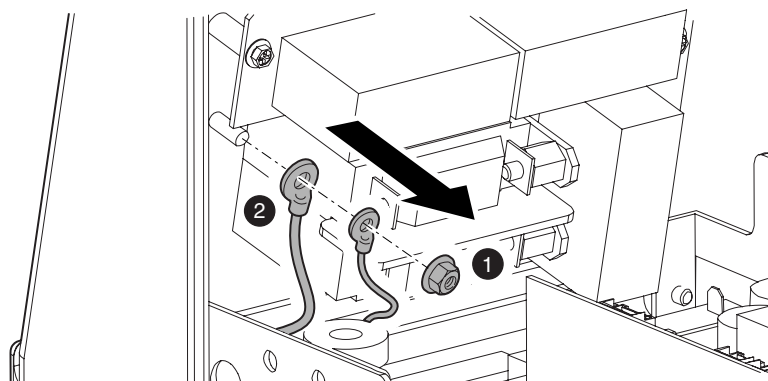


- 4) Cut the snap band. Open the Reactor (L101) and Remove the Reactor (L101).



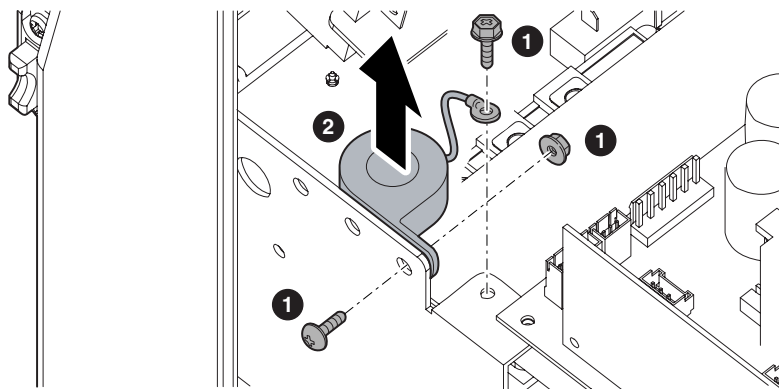
3.34 Earth Inductance (L103) ⚠

- 1) Remove the Side Panel. [Reference page: 11-1]
- 2) Remove the nut and then remove the two ground cables from the Rear Control Cover.



13 MAINTENANCE

- 3) Remove the two screws and the nut. Remove the Earth Inductance (L103).



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APPENDIX 1 PARTS LIST

1 Equipment Identification

All identification numbers as described in the Introduction chapter must be furnished when ordering parts or making inquiries. This information is usually found on the nameplate attached to the equipment. Be sure to include any dash numbers following the Specification or Assembly numbers.

2 How To Use This Parts List

The Parts List is a combination of an illustration and a corresponding list of parts which contains a breakdown of the equipment into assemblies, subassemblies, and detail parts. All parts of the equipment are listed except for commercially available hardware, bulk items such as wire, cable, sleeving, tubing, etc., and permanently attached items which are soldered, riveted, or welded to other parts. The part descriptions may be indented to show part relationships. To determine the part number, description, quantity, or application of an item, simply locate the item in question from the illustration and refer to that item number in the corresponding Parts List.

TRANSTIG 200 AC/DC 700719

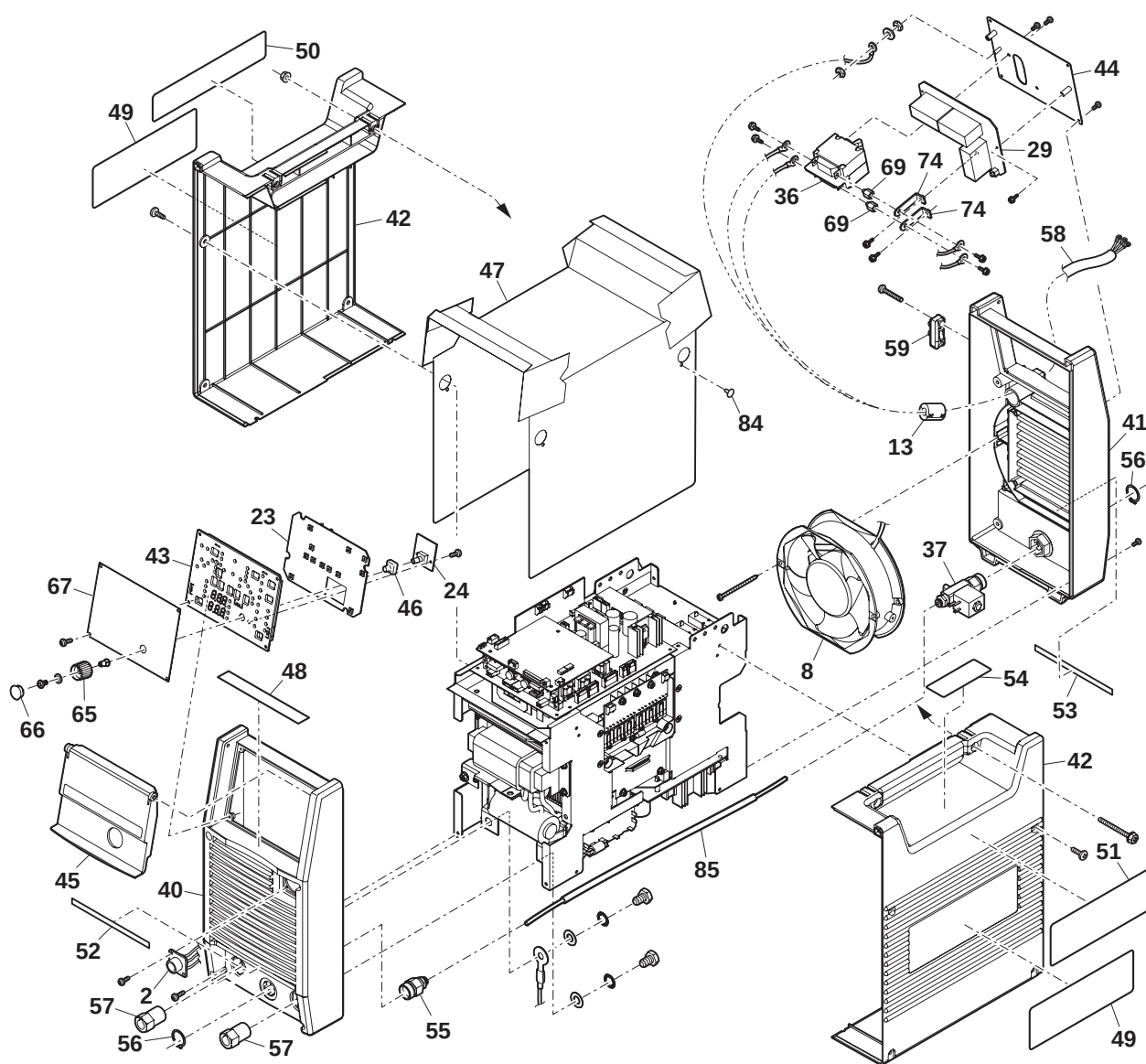
No.	DWG No.	Part No.	Description	Type & Rating	QTY.
1	CC1	W7001384	Coupling Coil, gen 3.1, IPS	F3A040600 200A CC	1
2	CON1	W7001595	Post, Output, gen 3.1, IPS	206433-1 8P (with Wiring Assembly)	1
3	CT2	W7001304	Transformer, gen 3.1, IPS	F2A503001 CT 1:40	1
4	D1	10-6628	Diode, gen 3.1, IPS	DFA50BA160	1
5	D2	10-6629	Diode, gen 3.1, IPS	DBA200UA60	1
6	D4	10-6629	Diode, gen 3.1, IPS	DBA200UA60	1
7	D5	10-6629	Diode, gen 3.1, IPS	DBA200UA60	1
8	FAN1	W7001307	Fan, gen 3.1, IPS	109E5724H507 DC 24V 16.8W	1
9	FCH1	W7001502	Inductor, gen 3.1, IPS	F3A285101 AC/DC FCH	1
10	HCT1	10-5003	Sensor, Current, gen 3.1, IPS	HC-TN200V4B15M 200A 4V	1
11	HF.UNIT1	W7001399	HF, Unit, gen 3.1, IPS	HF.UNIT (WK-4840 U04)	1
12		10-6633	HF, Gap, gen 3.1, IPS	U0A601100	1
13	L101	W7001400	Reactor, gen 3.1, IPS	ZCAT-3035-1330	1
14	L103	W7001605	Inductor, earth, gen 3.1, IPS	SNG-25B-600	1
15	PCB1	W7001402	PCB, gen 3.1, IPS	WK-5477 U01 MAIN_PCB	1
16	PCB2	W7001601	PCB, gen 3.1, IPS	WK-5596 U02 CVM CONTROL PCB	1
17	PCB3	W7001314	PCB, gen 3.1, IPS	WK-5548 U01 DDC PCB	1
18	PCB4	10-6635	PCB, gen 3.1, IPS	WK-4819 U01 DETECT PCB	1
19	PCB5	W7001417	PCB, gen 3.1, IPS	WK-5551 U01 CONECT PCB	1
20	PCB6	W7001727	PCB, gen 3.1, IPS	WK-5549 U07-1 200A CTRL PCB	1
21	PCB7	W7001423	PCB, gen 3.1, IPS	WK-5550 U01 FILTER PCB	1
22	PCB8-9	W7001318	PCB, gen 3.1, IPS	WK-5479 U01 GATE PCB (with	2
23	PCB10	W7001812	PCB,WK5527 U13,GEN3.1,IPS	WK-5527 U13 PANEL PCB	1
24	PCB11	W7001320	PCB, gen 3.1, IPS	WK-5528 U01 ENCODER PCB	1
25	PCB12	W7001594	PCB, gen 3.1, IPS	WK-5615 U01 DIODE SNUBBER PCB	1
26	PCB13	W7001433	PCB, gen 3.1, IPS	WK-5569 U01 GATE/INPOSE PCB	1
27	PCB14	W7001434	PCB, gen 3.1, IPS	WK-5570 U01 IGBT SNUBBER PCB	1
28	PCB16	W7001324	PCB, gen 3.1, IPS	WK-5499 U01 FILTER PCB	1
29	PCB17	10-6740	PCB, gen 3.1, IPS	WK-4917 U04 INPUT FILTER PCB	1
30	PCB18	W7001602	PCB, gen 3.1, IPS	WK-5861 CE FILTER PCB	1
31	Q13	10-6643	Transistor, gen 3.1, IPS	GCA200CA60 (with WK-3367 U04)	1
32	R2	W7001449	Resistor, gen 3.1, IPS	ERG3SJ220H 3W 22Ω	2
33	R3	10-5137	Resistor, gen 3.1, IPS	JG23V101J 68W 100Ω	2

PARTS LIST

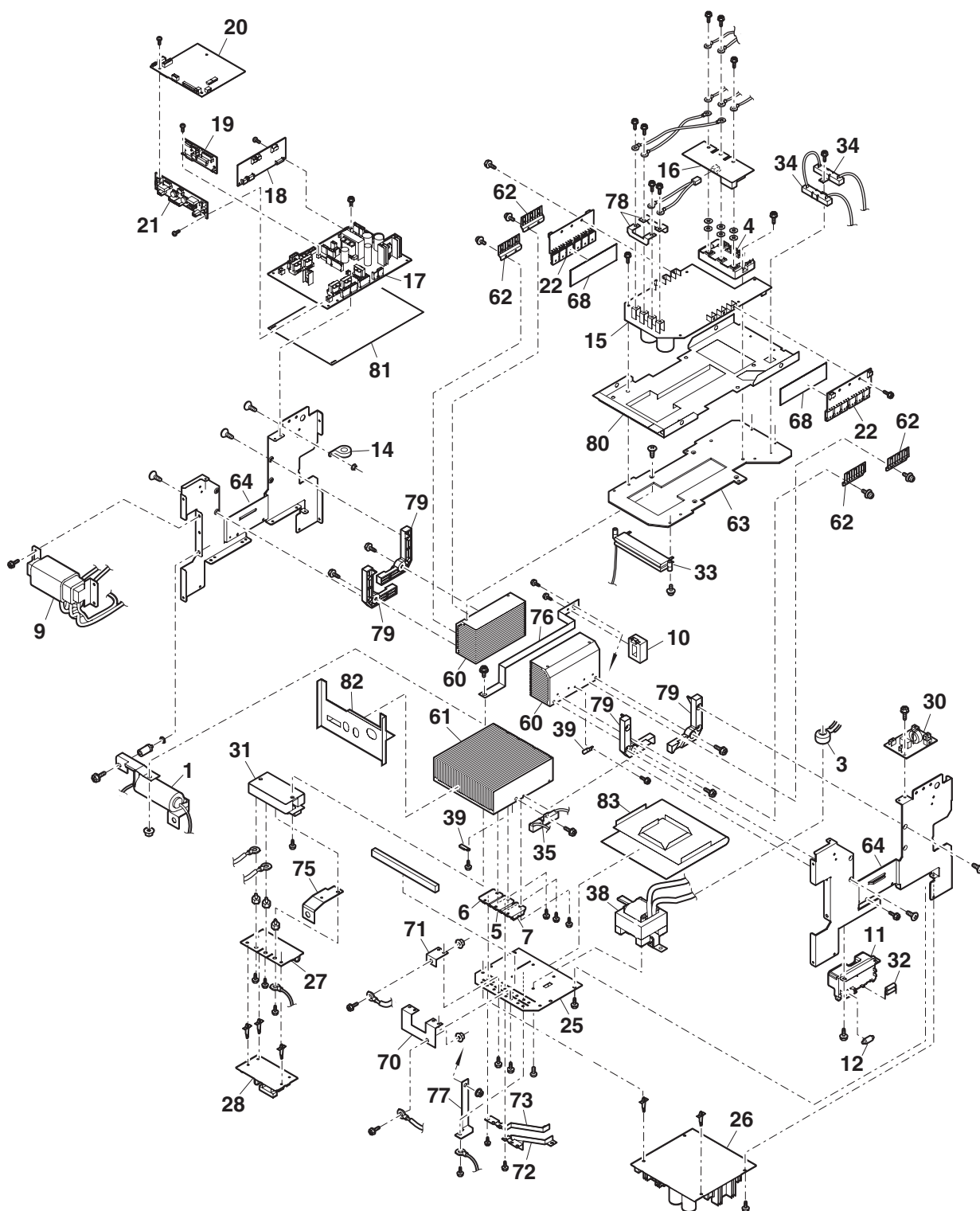
No.	DWG No.	Part No.	Description	Type & Rating	QTY.
34	R4-5	W7001452	Resistor, gen 3.1, IPS	MHS20A221KI 20W 220Ω	1
35	R6	W7001451	Resistor, gen 3.1, IPS	MHS20A101KI 20W 100Ω	1
36	S1	W7001453	Switch, gen 3.1, IPS	DCP-52SR50C-480V 2P-480V (185ACDC)	1
37	SOL1	W7001604	Solenoid Valve, gen 3.1, IPS	5505NBR1.5 DC24V 11VA/10W (with Gas Inlet and PC4-02)	1
38	T1	W7001456	Transformer, gen 3.1, IPS	F3A063501 200A MAIN TR	1
39	TH1, 2	10-5228	Thermistor, gen 3.1, IPS	ERTA53D203 20kΩ/25°C B=3950K	2
40		W7001465	Panel, Front, gen 3.1, IPS	E0D005301	1
41		W7001466	Panel, Rear, gen 3.1, IPS	E0D005501	1
42		W7001467	Label, Side, gen 3.1, IPS	E0D005407	2
43		W7001331	Case, cover, gen 3.1, IPS	E0C346000	1
44		W7001584	Cover, Rear, gen 3.1, IPS	JDA173200 (200ACDC)	1
45		W7001598	Cover, Protector, gen 3.1, IPS	E0C303200	1
46		10-6791	Cover, Encoder, gen 3.1, IPS	EBA514400	1
47			Cover, PCB, gen 3.1, IPS	E1B537600 (with Dustcover Sheet)	1
48		W7001600	Label, Name, gen 3.1, IPS	N4A932900 (200ACDC)	1
49		W7001338	Label, Side, gen 3.1, IPS	N4A785200	2
50		W7001339	Label, 1 Warning, gen 3.1, IPS	N1B029700	1
51		W7001340	Label, 2 Warning, gen 3.1, IPS	N1B029800	1
52		W7001615	Label, output term gen 3.1, IPS	N4A670600	1
53		10-6733	Label, Gas Input, gen 3.1, IPS	N4A040700	1
54		W7001345	Label, VRD, gen 3.1, IPS	N4A919100	1
55		W7001603	Outlet, Gas, gen 3.1, IPS	EDA268800 (with PC4-02)	1
56		10-5184	C-Ring, gen 3.1, IPS		2
57		10-6660	Terminal, Output F, gen 3.1, IPS	TRAK-BE35-70S	2
58		N/A	Cable, Input, gen 3.1, IPS	132"10/3SOWBLKW/R650 (185ACDC)	1
59		10-6662	Clamp, Input, gen 3.1, IPS	EBA045800	1
60		W7001574	Heatsink, gen 3.1, IPS	E1B869900	2
61		W7001575	Heatsink, gen 3.1, IPS	E1B870000	1
62		W7001351	Spring Clip, IGBT, gen 3.1, IPS	E1B850100	4
63		W7001583	Chassis, PCB1, gen 3.1, IPS	J5B017400	1
64		W7001582	Chassis, gen 3.1, IPS	J3C356500	1
65		10-6665	Knob, gen 3.1, IPS	2621603	1
66		10-6666	Knob Cap, gen 3.1, IPS	3021104	1
67		W7001585	Cover, Protector, gen 3.1, IPS	N1B016200	1
68		W7001357	Sheet, rubber, gen 3.1, IPS	EDA227700	4
69		W7001358	Post, 1(M5), gen 3.1, IPS	EBA643600 (M5-M5)	3
70		W7001576	Bus Bar, 1 D-L, gen 3.1, IPS	ECA879500	1
71		W7001577	Bus Bar, 2 D-L, gen 3.1, IPS	ECA879600	1
72		W7001578	Bus Bar, 1 T-D, gen 3.1, IPS	ECA887200	1
73			Bus Bar, 2 T-D, gen 3.1, IPS	ECA887300	1
74		10-6868	Bus Bar, S1, gen 3.1, IPS	ECA321000	2
75		W7001610	Bus Bar, gen 3.1, IPS	ECA901400	1
76		W7001611	Bus Bar, T-CC, gen 3.1, IPS	ECA904200	1
77		W7001612	Bus Bar, T, gen 3.1, IPS	EDA022400	1
78		W7001613	Bus Bar, gen 3.1, IPS	EDA069100	2
79		W7001369	Insulated Board, gen 3.1, IPS	E1B872000	2
80		W7001607	Insulation Sheet, gen 3.1, IPS	E1B859500	1
81		W7001614	Insulation Sheet, gen 3.1, IPS	EDA174000	1

PARTS LIST

No.	DWG No.	Part No.	Description	Type & Rating	QTY.
82		W7001616	Sheet, dust cover F, gen 3.1, IPS	E1B935200	1
83		W7001609	Sheet, dust cover R, gen 3.1, IPS	E1B935600	1
84		W7001374	Clip, gen 3.1, IPS	#74 NATURAL 4	4
85		W7001618	Hose, Nylon, gen 3.1, IPS	T0425B Nylon Hose L=0.5m	1
86		10-2020	Plug, Output, gen 3.1, IPS	TRAK-SK50	1
87		300X4903	Operating Manual, gen 3.1, IPS	Operating Manual	1



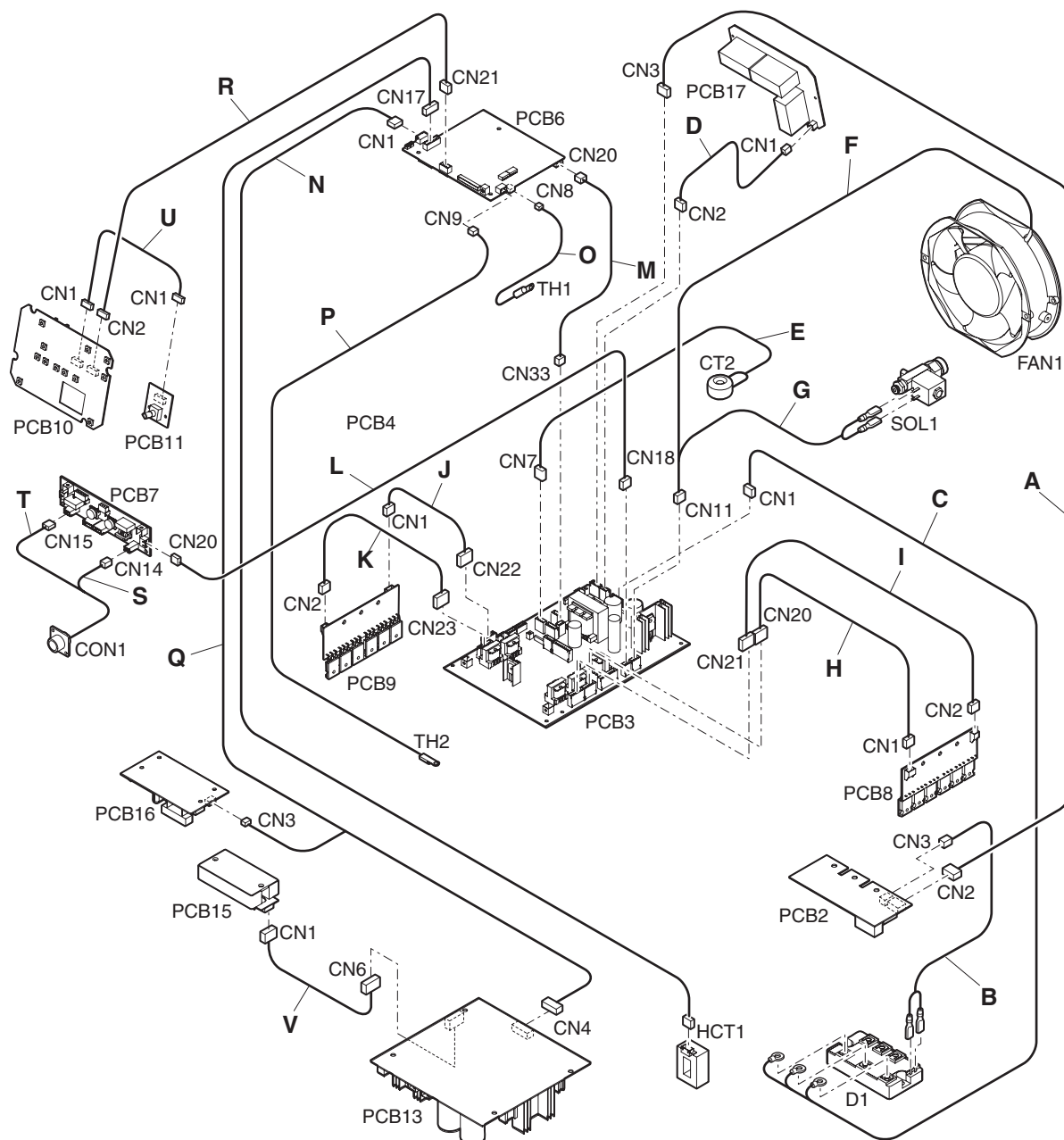
PARTS LIST



APPENDIX 2 CONNECTION WIRING GUIDE

	Destination				
A	PCB2	CN2	↔	PCB3	CN3
B	PCB2	CN3	↔	D1	
C	PCB3	CN1	↔	D1	
D	PCB3	CN2	↔	PCB17	CN1
E	PCB3	CN7	↔	CT2	
F	PCB3	CN11	↔	FAN1	
G				SOL1	
H	PCB3	CN20	↔	PCB8	CN1
I	PCB3	CN21	↔	PCB8	CN2
J	PCB3	CN22	↔	PCB9	CN1
K	PCB3	CN23	↔	PCB9	CN2
L	PCB3	CN18	↔	PCB7	CN20
M	PCB3	CN33	↔	PCB6	CN20
N	PCB6	CN1	↔	HCT1	
O	PCB6	CN8	↔	TH1	
P	PCB6	CN9	↔	TH2	
Q	PCB6	CN17	↔	PCB13	CN4
				PCB16	CN3
R	PCB6	CN21	↔	PCB10	CN2
S	PCB7	CN14	↔	CON1	
T		CN15			
U	PCB10	CN1	↔	PCB11	CN1
V	PCB13	CN6	↔	PCB15	CN1

CONNECTION WIRING GUIDE



APPENDIX 3 DIODE TESTING BASICS

Testing of diode modules requires a digital Volt/Ohmmeter that has a diode test scale. Locate the diode module to be tested. Remove cables from mounting studs on diodes to isolate them within the module. Set the digital volt/ohm meter to the diode test scale. Using figure 1 and 2, check each diode in the module. Each diode must be checked in both the forward bias (positive to negative) and reverse bias (negative to positive) direction.

1. To check the diode in the forward bias direction, connect the volt/ohm meter positive lead to the anode (positive, +) of the diode and the negative lead to the cathode (negative, -) of the diode (refer to Figure 13-1). A properly functioning diode will conduct in the forward bias direction, and will indicate between 0.3 and 0.9 volts.
2. To check the diode in the reverse bias direction, reverse the meter leads (refer to Figure 13-1). A properly functioning diode will block current flow in the reverse bias direction, and depending on the meter function, will indicate an open or "OL".
3. If any diode in the module tests as faulty, replace the diode module.
4. Reconnect all cables to the proper terminals.

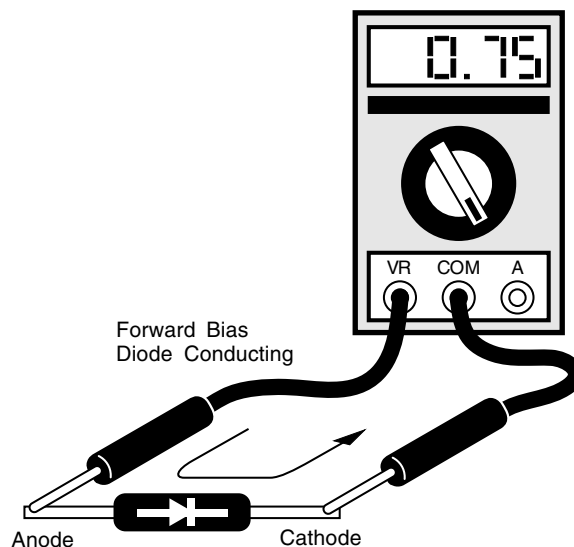


Figure 13-1: Forward bias diode test

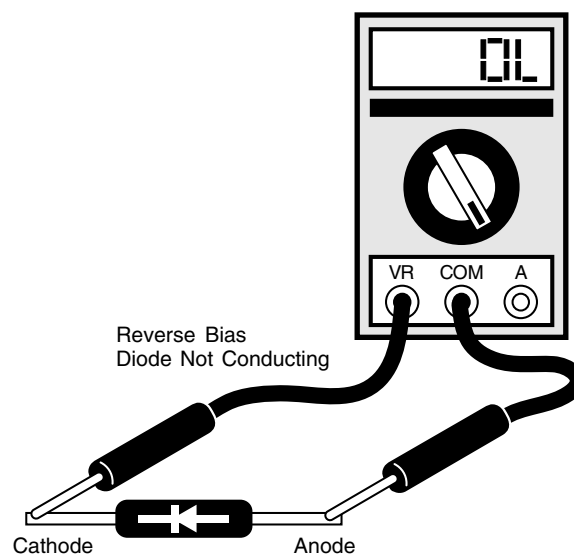
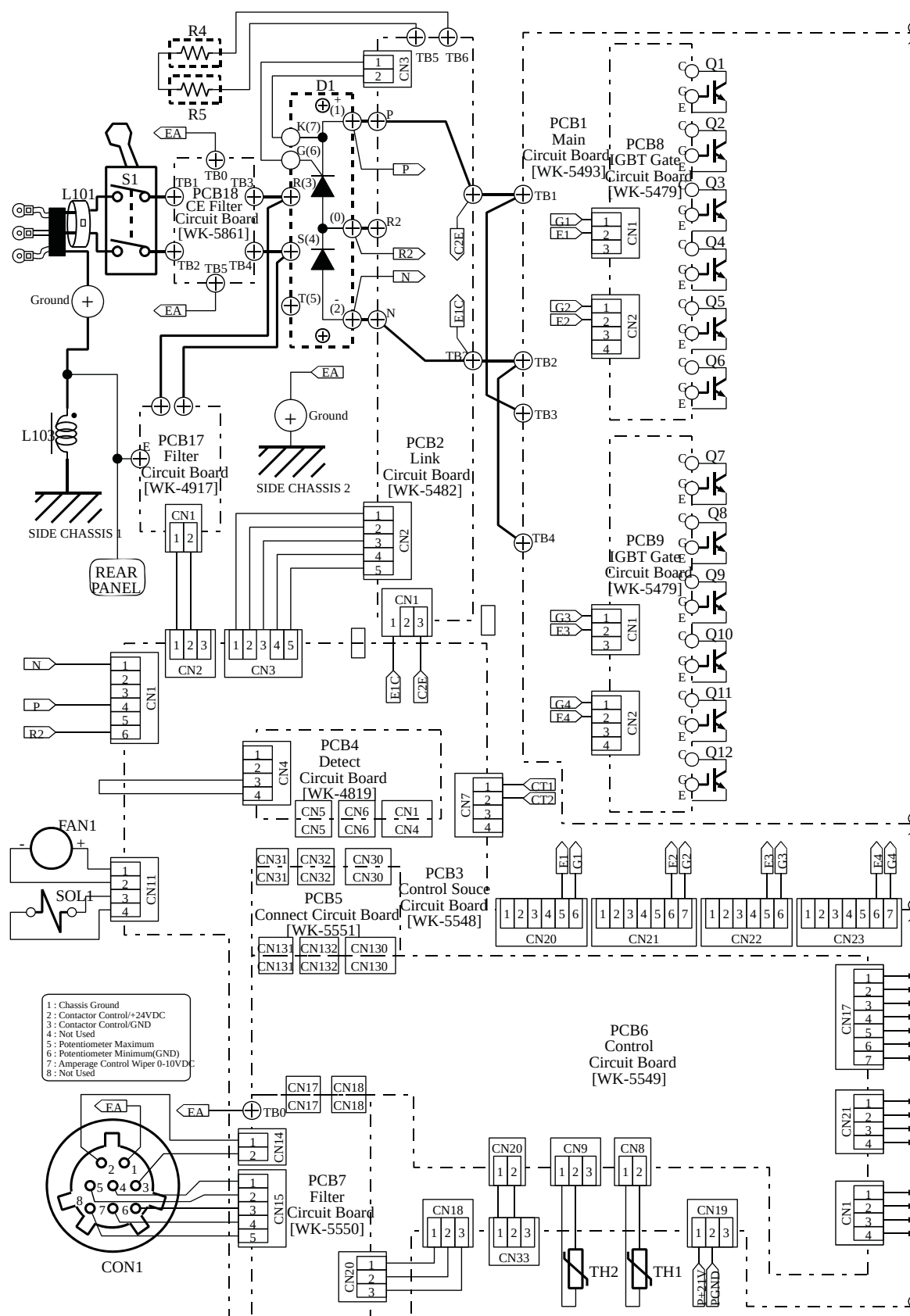


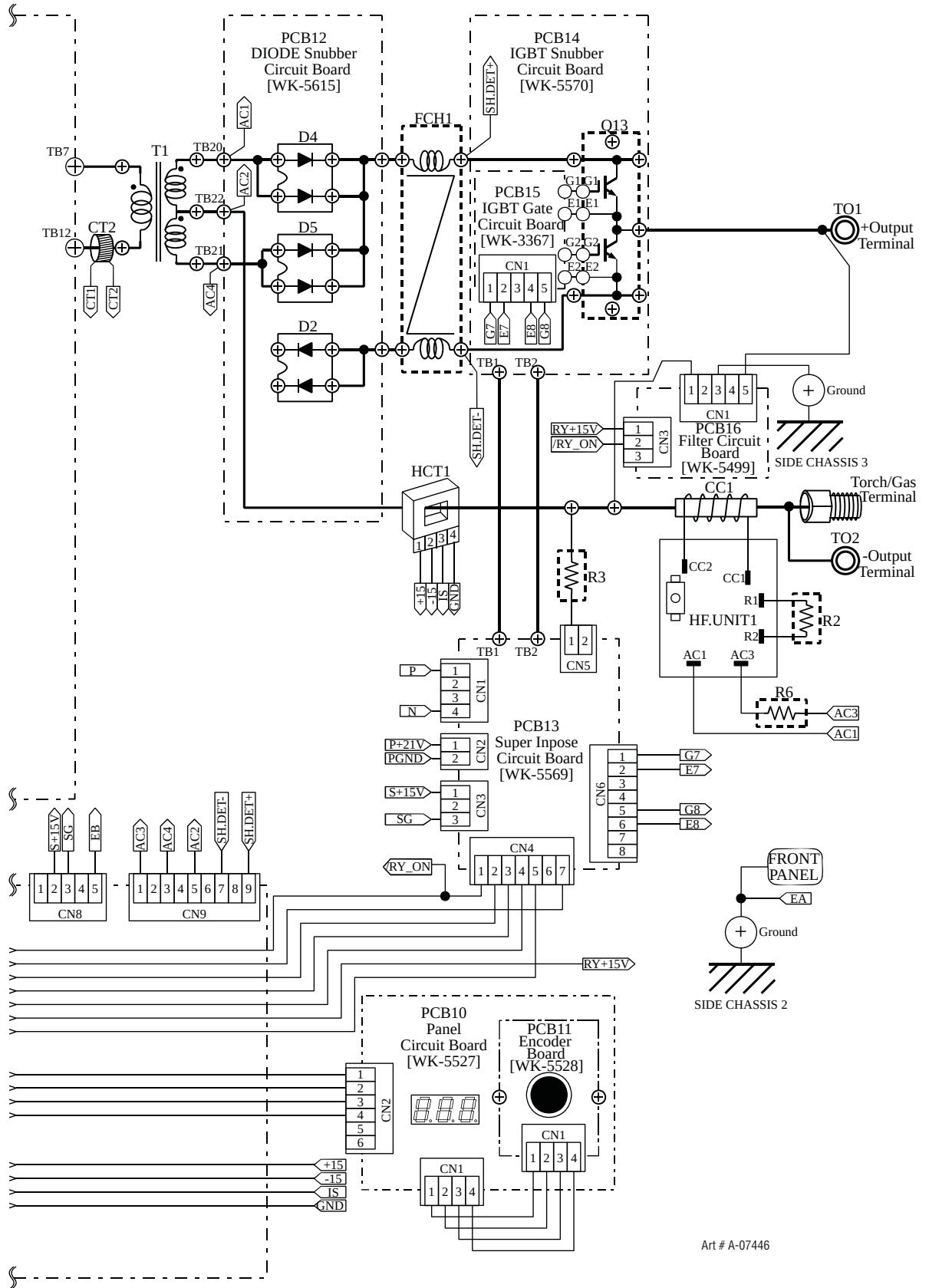
Figure 13-2: Reverse bias diode test

APPENDIX 4: TRANSTIG 200 AC/DC ACCESSORIES

Description	Part No.	Details
17 Series air cooled TIG torch (suitable for TransTig 200Pi)	518710402	TIG torch with 4 metre cable & remote current control
26 Series air cooled TIG torch	538720401	TIG torch with 4 metre cable & remote current control
200 Amp lead set, 5 metre	646323	1 x 5m work lead; 1 x 5m electrode holder
400 Amp lead set, 8 metre	646325	1 x 8m work lead; 1 x 8m electrode holder
Slide controller	OTD 10/4013	200Pi, 200AC/DC slider only
	OTD 10/2004	300Pi, 300AC/DC, 400i slider only
Hand pendant	OTD 10/4014	200Pi, 200AC/DC hand pendant only
	OTD 10/2005	300Pi, 300AC/DC, 400i hand pendant only
Foot controller	OTD 10/4016	200Pi, 200AC/DC
	OTD 10/2007	300Pi, 300AC/DC, 400i
CIGWELD COMET argon regulator	301527	Regulator only
CIGWELD COMET argon flowmeter 0-15 lpm	301710	Flowmeter only
CIGWELD COMET argon flowmeter 10-40 lpm	301711	Flowmeter only
CIGWELD COMET argon regulator/flowmeter	301526	Regulator/flowmeter only
VAF-4 Wirefeeder (for 400i ONLY)	705700	VAF-4 wirefeeder, 8m interconnection, operating manual
VS212 Voltage sensing wirefeeder	W3512006	VS212 wirefeeder, operating manual
Tweco® 4 MIG Torch	717201	MIG torch with 3.6m cable, T4 connection
ArcMaster Pro Auto-darkening Helmet, 9-13 – blue	454294	Welding helmet, 2 x spare cover lenses, product bag, operating manual
ArcMaster Pro Auto-darkening Helmet, 9-13 – blue with graphic	454295	Welding helmet, 2 x spare cover lenses, product bag, operating manual
ArcMaster Pro Auto-darkening Helmet, 9-13 – black with graphic	454296	Welding helmet, 2 x spare cover lenses, product bag, operating manual

APPENDIX 5: TRANSTIG 200 AC/DC INTERCONNECTION DIAGRAM





Art # A-07446

NOTES

CIGWELD LIMITED WARRANTY

LIMITED WARRANTY: CIGWELD, A Thermadyne Company, hereafter, "CIGWELD" warrants to customers of its authorized distributors hereafter "Purchaser" that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the time period applicable to the CIGWELD products as stated below, CIGWELD shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with CIGWELD's specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or accident, correct such defects by suitable repair or replacement, at CIGWELD's sole option, of any components or parts of the product determined by CIGWELD to be defective.

CIGWELD MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHERS, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF LIABILITY: CIGWELD SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, SUCH AS, BUT NOT LIMITED TO, LOST PROFITS AND BUSINESS INTERRUPTION. The remedies of the Purchaser set forth herein are exclusive and the liability of CIGWELD with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by CIGWELD whether arising out of contract, negligence, strict tort, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liability is based. No employee, agent, or representative of CIGWELD is authorized to change this warranty in any way or grant any other warranty.

PURCHASER'S RIGHTS UNDER THIS WARRANTY ARE VOID IF REPLACEMENT PARTS OR ACCESSORIES ARE USED WHICH IN CIGWELD'S SOLE JUDGEMENT MAY IMPAIR THE SAFETY OR PERFORMANCE OF ANY CIGWELD PRODUCT. PURCHASER'S RIGHTS UNDER THIS WARRANTY ARE VOID IF THE PRODUCT IS SOLD TO PURCHASER BY NON-AUTHORIZED PERSONS.

The warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date CIGWELD delivered the product to the authorized distributor.

Terms of Warranty – January 2008

1. The Trade Practices Act 1974 (Commonwealth) and similar State Territory legislation relating to the supply of goods and services, protects consumers' interests by ensuring that consumers are entitled in certain situations to the benefit of various conditions, warranties, guarantees, rights and remedies (including warranties as to merchantability and fitness for purpose) associated with the supply of goods and services. A consumer should seek legal advice as to the nature and extent of these protected interests. In some circumstances, the supplier of goods and services may legally stipulate that the said conditions, warranties, guarantees, rights and remedies are limited or entirely excluded. The warranties set out in Clause 2 shall be additional to any nonexcludable warranties to which the Customer may be entitled pursuant to any statute.

2. Subject to Clause 3. CIGWELD gives the following warranties to the Customer:

Insofar as they are manufactured or imported by CIGWELD, goods will upon delivery be of merchantable quality and reasonably fit for the purpose for which they are supplied by CIGWELD.

CIGWELD will repair or, at its option, replace those of the goods which, upon examination, are found by CIGWELD to be defective in workmanship and/or materials.

CIGWELD reserves the right to request documented evidence of date of purchase.

3. The Warranty in Clause 2;

Is conditional upon:

The Customer notifying CIGWELD or our Accredited Distributor in writing of its claim within seven (7) days of becoming aware of the basis thereof, and at its own expense returning the goods which are the subject of the claim to CIGWELD or nominated Accredited Distributor/Accredited Service Provider. The goods being used in accordance with the Manufacturer's Operating Manuals, and under competent supervision.

Does not apply to:

Obsolete goods sold at auction, second-hand goods and prototype goods.

Breakdown or malfunction caused by accident, misuse or normal wear and tear.

Repairs or replacement made other than by CIGWELD or Accredited Service Providers, unless by prior arrangement with CIGWELD.

Replacement parts or accessories which may affect product safety or performance and which are not manufactured, distributed or approved by CIGWELD.

4. CIGWELD declares that, to the extent permitted by law, it hereby limits its liability in respect of the supply of goods which are not of a kind ordinarily acquired for personal, domestic or household use or consumption to any one or more of the following (the choice of which shall be at the option of CIGWELD).

The replacement of the goods or the supply of equivalent goods.

The repair of goods.

The payment of cost of replacing the goods or acquiring equivalent goods.

The payment of the cost of having goods repaired.

5. Except as provided in Clauses 2 to 4 above, to the extent permitted by statute, CIGWELD hereby excludes all liability for any loss, damage, death or injury of any kind whatsoever occasioned to the Customer in respect of the supply of goods including direct, indirect, consequential or incidental loss, damage or injury of any kind.

Warranty Schedule – January 2008

These warranty periods relate to the warranty conditions in clause 2. All warranty periods are from date of sale from the Accredited Distributor of the equipment. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date CIGWELD delivered the product to the Accredited Distributor. Unless otherwise stated the warranty period includes parts and labour. CIGWELD reserves the right to request documented evidence of date of purchase.

MULTI PROCESS EQUIPMENT *WARRANTY PERIOD*

<u>CIGWELD PROFESSIONAL INVERTER WELDING EQUIPMENT</u>	<u>WARRANTY PERIOD</u>	<u>LABOR</u>
Transtig 200 Pi, Transtig 200 AC/DC, Transarc 300 Si, Transtig 300 Pi, Transtig 300 AC/DC, Transmig 400 i		
Original Main Power Magnetics.....	3 years	2 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semiconductors.....	2 years	2 years
All other circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors.....	1 year	1 year

Please note that the information detailed in this statement supersedes any prior published data produced by CIGWELD.



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Telephone: (940) 566-2000
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